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EARTH-MARS-EARTH BALLISTIC TRAJECTORY DATA, 1975-1986

Volume IV: Mission-Map Data, 1980 Opposition Period

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GENERAL DYNAMICS/FORT WORTH

A Division of General Dynamics Corporation

FOREWORD

This document contains trajectory data for Earth-Mars and Mars-Earth planar ballistic transfers in the 1980 opposition period. The complete report consists of seven volumes:

Volume I: Description and Application of Data

Volume II: Mission-Map Data, 1975 Opposition Period

Volume III: Mission-Map Data, 1978 Opposition Period

Volume IV: Mission-Map Data, 1980 Opposition Period

Volume V: Mission-Map Data, 1982 Opposition Period

Volume VI: Mission-Map Data, 1984 Opposition Period

Volume VII: Mission-Map Data, 1986 Opposition Period

The mission-map data contained in this report were generated in support of a study on Manned Mars Exploration in the Unfavorable Time Period (1975-1985). This investigation was performed by General Dynamics/Fort Worth for the George C. Marshall Space Flight Center of the National Aeronautics and Space Administration. Only trajectory data for selected types of round-trip missions were published as a direct result of the study contract. Because the mission-map data are applicable to a wide variety of Mars missions, and particularly because they span the time interval during

which manned interplanetary capture missions will probably first become feasible, it was decided to document and publish these data in their entirety as a part of the General Dynamics/Fort Worth internal research program.

Previous publications of a similar nature are referenced in Volume I. The purpose of this report is to complement, rather than replace, the earlier data. Some trajectory parameters contained in this report have not heretofore been published. In some instances, the range of launch dates and flight times has been extended beyond that of previous publications. However, the strongest justification for the current publication is based on the format employed for computer output. The basic mission-map format is not original, but it is believed that the incorporation of a number of refinements has resulted in a format which is significantly better adapted to certain types of interplanetary mission analyses than that of any previous publication.

ACKNOWLEDGMENTS

The author is indebted to Dr. Vernon A. Lee for his advice concerning trajectory computation methods, and to Mr. Oliver A. Schwausch and Mr. John J. Miller for their assistance in preparing the data for publication.

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NOTATION

AU	Astronomical unit (149.599×10^6 kilometers)
ALENT	Earth atmospheric entry altitude (kilometers)
ALMARS	Mars parking orbit altitude (kilometers)
ALPARK	Earth parking orbit altitude (kilometers)
EMOS	Earth mean orbital speed (29.785 kilometers/second, or 97.719×10^3 feet/second)
ECMARS	Mars parking orbit eccentricity
ECPARK	Earth parking orbit eccentricity
ENTMAX	Maximum allowable Earth atmospheric entry velocity (kilometers/second)
JD	Julian date (days)
r	Heliocentric radial distance (AU)
t	Time (days)
ΔV	Propulsive velocity increment (kilometers/second)

EXPLANATION OF DATA

General

The trajectory data contained in this document are essentially self-explanatory. Every page of data is completely identified as to content. The identification includes a verbal description of the data and their physical dimensions. The planar ballistic heliocentric trajectories to which the data apply are completely identified by flight time, departure date, and arrival date. Both the civil dates (year, month, and day) and the Julian dates of departure and arrival are tabulated. A detailed description of the data and computation methods is presented in Volume I. A brief summary of the more important points relating to the use of the data is presented in the following subsections.

Computer Program

An IBM 7090 computer program was used to map numerical values of selected trajectory parameters at 10-day intervals on a Mars-date versus Earth-date grid. This computer program, which was developed by General Dynamics/Fort Worth, is quite flexible and economical. The average computer time required to generate a typical set of 12 printer maps (273 trajectories x 21 mapped parameters) is approximately 30 seconds. The program is capable of computing trajectory data for transfer between any two bodies in heliocentric elliptical orbits. The

mission-map resolution (date interval) is variable down to a practical limit of approximately two-tenths of a day. Up to 12 pages of printer maps may be generated by each computer problem, with one or two trajectory parameters mapped on each page. The order and combination of mapped parameters is controlled by problem input data. The unit values of the mapped data are defined by the user's specification of a set of appropriate scale factors. Output headings on the printer maps are also specified by the user.

Planetary positions and velocities are determined by solution of the two-body equations. Mean orbit elements and their rates of variation at any convenient epoch are loaded as library input data, and the computer program then calculates mean fixed planetary orbit elements at an appropriate epoch for each problem, i.e., for each printer-map grid. Elements of the heliocentric transfer trajectories, for specified departure and arrival dates, are determined by the application of Lambert's theorem. Perturbations of the transfer trajectory are neglected.

Master Mission Map

Only a limited area of the complete Mars-date versus Earth-date survey region could be covered by a single page of computer output. In order to allow

an orderly survey of the overall 1975-1986 time period, a reference grid system was set up on a master mission map, as shown in Figure 1. Each small rectangle in this figure is identified by a unique pair of reference-grid coordinates (M02, E03, etc.), and represents a set of 13 pages of trajectory data. Every page in each set of data is identified by its reference-grid coordinates in the upper right-hand corner.

The first page in each 13-page set of data contains the mean planetary orbit elements upon which that particular set of trajectory data are based. The remaining 12 pages are the IBM 7090 printer maps containing the numerical values of 21 selected trajectory parameters. The printer map format is identical for inbound and outbound trajectories; in fact, inbound and outbound trajectory data often appear on the same printer map. Outbound trajectory data are distinguished only by the fact that the Mars date coordinate is greater than the Earth date coordinate. The converse is true, of course, for inbound trajectories.

Mapped Parameters

The order and contents of the printer maps are shown in Table 1.. The data contained in the first nine printer maps are applicable to any ballistic interplanetary mission profile; they are not significantly affected by the characteristics of the planetocentric segments of the complete transfer trajectory. The

angular coordinates of the departure and arrival asymptotes (Maps 2 and 3) are referenced to the mean-of-date equinox and equator of the applicable planet. The inclination of the transfer orbit (Map 7) is referenced to the mean-of-date ecliptic plane.

The data contained in Maps 10 through 12 are strictly applicable only to trajectory profiles having the following reference characteristics:

1. Outbound transfers
   a. The Earth escape maneuver is initiated from a circular orbit at 325 kilometers altitude.
   b. All-propulsive braking is used at Mars to enter a circular orbit at 800 kilometers altitude.
2. Inbound transfers
   a. The Mars escape maneuver is initiated from a circular orbit at 800 kilometers altitude.
   b. Earth-capture propulsive braking is used only (when required) to reduce the entry velocity to 15.24 kilometers/second at 121.92 kilometers altitude (50,000 feet/second at 400,000 feet).

Reference Earth entry velocities (15.24 kilometers/second or less) for inbound trajectories are contained in Map 10. For outbound trajectories, Map 10 contains the constant circular velocity in the Earth parking orbit, and is therefore of no particular consequence. Maps 11 and 12 contain propulsive velocity increment (ΔV) requirements applicable to the reference planetocentric profiles delineated under Items 1 and 2 above. All propulsive maneuvers were assumed to be impulsive and planar. Propulsive velocity requirements for other planetocentric profiles can be calculated, if desired, by use of the data contained in Maps 1-3 or, in some cases, by manipulation of the data in Maps 10-12.

The most significant deviation from the reference planetocentric profiles likely to be encountered in interplanetary missions will probably be in the allowable Earth entry velocity. Serious technical problems are associated with Earth atmospheric entry velocities of 15.24 kilometers/second, and interplanetary mission profiles based on such a high entry velocity may be too optimistic, especially before the 1980's. Propulsive velocity requirements for other entry velocity limits may be easily obtained by adding the propulsive braking ΔV (Map 11) to the reference entry velocity (Map 10) to obtain the unbraked entry velocity, and then subtracting the new value of maximum allowable entry velocity.

$$V_e = V_{e_{Ref}} + \Delta V_{4_{Ref}}$$

$$\Delta V_4 = V_e - V_{e_{Max}} \quad ; \quad V_e > V_{e_{Max}}$$

$$\Delta V_4 = 0 \quad ; \quad V_e \leq V_{e_{Max}}$$

where V_e = unbraked entry velocity

$V_{e_{Ref}}$ = reference entry velocity (Map 10)

$\Delta V_{4_{Ref}}$ = reference Earth-capture velocity increment (Map 11)

ΔV_4 = new Earth-capture velocity increment

$V_{e_{Max}}$ = new Earth entry velocity limit

Next to a different entry velocity limit, the most probable deviation in the mission profile will be a change in the circular parking orbit altitude at Earth and/or Mars. The effect of reasonable changes in planetocentric orbit altitudes on propulsive velocity requirements is relatively small. For reasonable hyperbolic excess velocities, a 1 percent change in planetocentric orbit radius will cause the ΔV required for escape or capture to change by less than 0.2 percent of the circular velocity at the applicable planet.

Incorporation of elliptical planetocentric orbits in the mission profile can cause significant changes in escape and/or capture ΔV requirements. If the escape

or capture maneuver is always initiated at periapsis of the planetocentric ellipse, and if the periapsis altitude is equal to the reference circular orbit altitude, the ΔV requirement for the applicable maneuver will be reduced by a constant amount regardless of the hyperbolic excess velocity. The magnitude of this reduction is given by the equation:

$$\delta \Delta V = V_c(\sqrt{1 + e} - 1)$$

where V_c = circular velocity at reference altitude

e = planetocentric orbit eccentricity

The reference circular velocities at Earth and Mars are 7.72 kilometers/second and 3.21 kilometers/second, respectively.

ΔV Contour Charts

The total propulsive velocity increment is generally the most significant single parameter for the purpose of trajectory evaluation, and the one which is most widely used for preliminary trajectory selection. For this reason, a contour chart of both outbound and inbound one-way total ΔV requirements for the entire opposition period is presented in Figure 2. These total ΔV values correspond to those listed in Map 12, and they are merely the sums of the escape and

capture ΔV values presented in Map 11. Velocity requirements for surface-to-orbit operations, planetocentric orbit modification, guidance, gravity loss, and performance reserves are not included. As noted in the previous subsection, the velocity increments of Figure 2 are precisely applicable only to mission profiles having the specific planetocentric characteristics previously described; however, they are useful for comparative evaluation of heliocentric trajectories even when alternate planetocentric ground rules are applied.

ERRORS AND ACCURACY

The printer map format of the computer program allows a maximum of four decimal digits for any number appearing in the data region of the map. A value of ±9999 signifies that the actual number went "off scale" in the direction indicated by the algebraic sign. All "on-scale" positive numbers are rounded off to the nearest low-order digit. Due to an error in the round-off equation used in the mapping subroutine, the absolute values of all on-scale negative numbers are one unit too small. For instance, a number listed as "-678" should read "-679." The computer program was corrected after the data of this report were generated, but since the error is consistent and relatively minor (the erroneous numbers were not used in any subsequent calculations within the computer program), it was not considered necessary to recompute the existing data.

Certain internal tests were incorporated in the computer program to check the accuracy of the computed data. Zeros will be found occasionally in the printer maps because the computed data failed to pass these tests. In such cases, rather than print out questionable information, all data for the applicable trajectory were set equal to zero. These occurrences are infrequent, and the affected trajectories are seldom of interest because their energy requirements

are very high. (Zeros also appear on the printer maps whenever the interplanetary flight time was less than 60 days or greater than 700 days; i.e., data were not computed for flight times outside of these limits.

With the exception of the error described in the first paragraph, all data are believed to be accurate to the lowest-order digit appearing on the computer output sheets. Random spot checks were made to verify the accuracy of the data, but it is impossible to verify every number in such a bulk of data. It is requested that the author be notified of any errors which might be discovered.

TABLE 1

MAPPED PARAMETERS

Earth-Mars/Mars-Earth Trajectories

Map No.		Parameters
1.	(a)	Hyperbolic excess speed at Earth departure/Earth arrival
	(b)	Hyperbolic excess speed at Mars arrival/Mars departure
2.	(a)	Declination of Earth departure/Earth arrival asymptote
	(b)	Right ascension of Earth departure/Earth arrival asymptote
3.	(a)	Declination of Mars arrival/Mars departure asymptote
	(b)	Right ascension of Mars arrival/Mars departure asymptote
4.	(a)	Communication distance at Mars arrival/Mars departure
5.	(a)	Sun-Mars-Earth angle at Mars arrival/Mars departure
	(b)	Sun-Earth-Mars angle at Mars arrival/Mars departure
6.	(a)	Heliocentric transfer angle
	(b)	True anomaly in transfer orbit at Earth departure/Mars departure
7.	(a)	Inclination of transfer orbit, relative to ecliptic
	(b)	Eccentricity of transfer orbit
8.	(a)	Perihelion distance
	(b)	Aphelion distance
9.	(a)	$\int_{t_1}^{t_2} r^{-2} dt$ (Solar radiation parameter)
	(b)	$\int_{t_1}^{t_2} r^{-1} dt$ (Solar radiation parameter)
10.	(a)	Perigee speed at Earth departure/Earth arrival (Entry speed for inbound trajectory)

TABLE 1

MAPPED PARAMETERS (CONT'D.)

Map No.	Parameters
11. (a)	Propulsive ΔV required for Earth departure/Earth capture
(b)	Propulsive ΔV required for Mars capture/Mars departure
12. (a)	Total propulsive ΔV required for one-way trip
(b)	Heliocentric transfer angle (repeated)

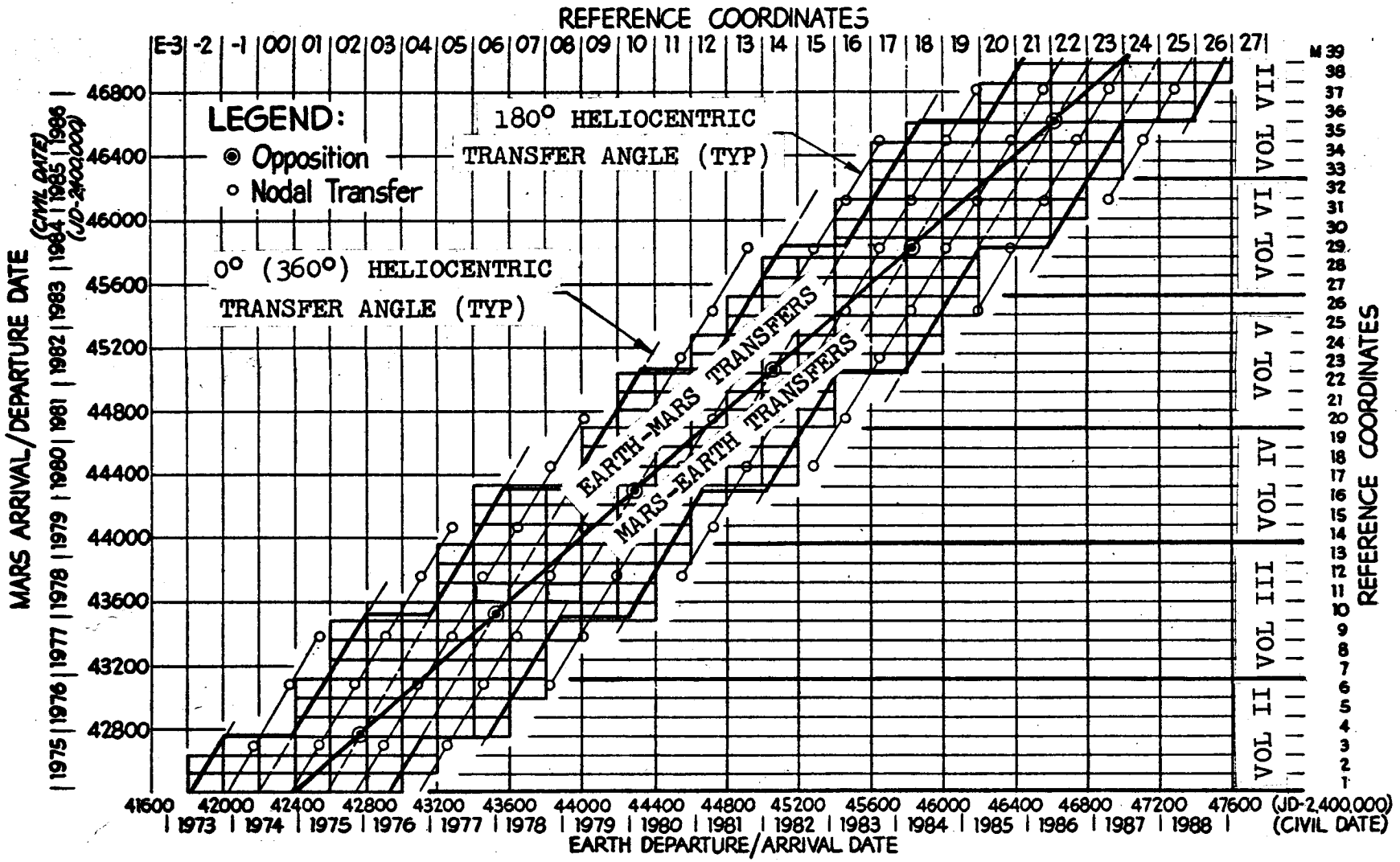

FIGURE 1 MASTER MISSION MAP

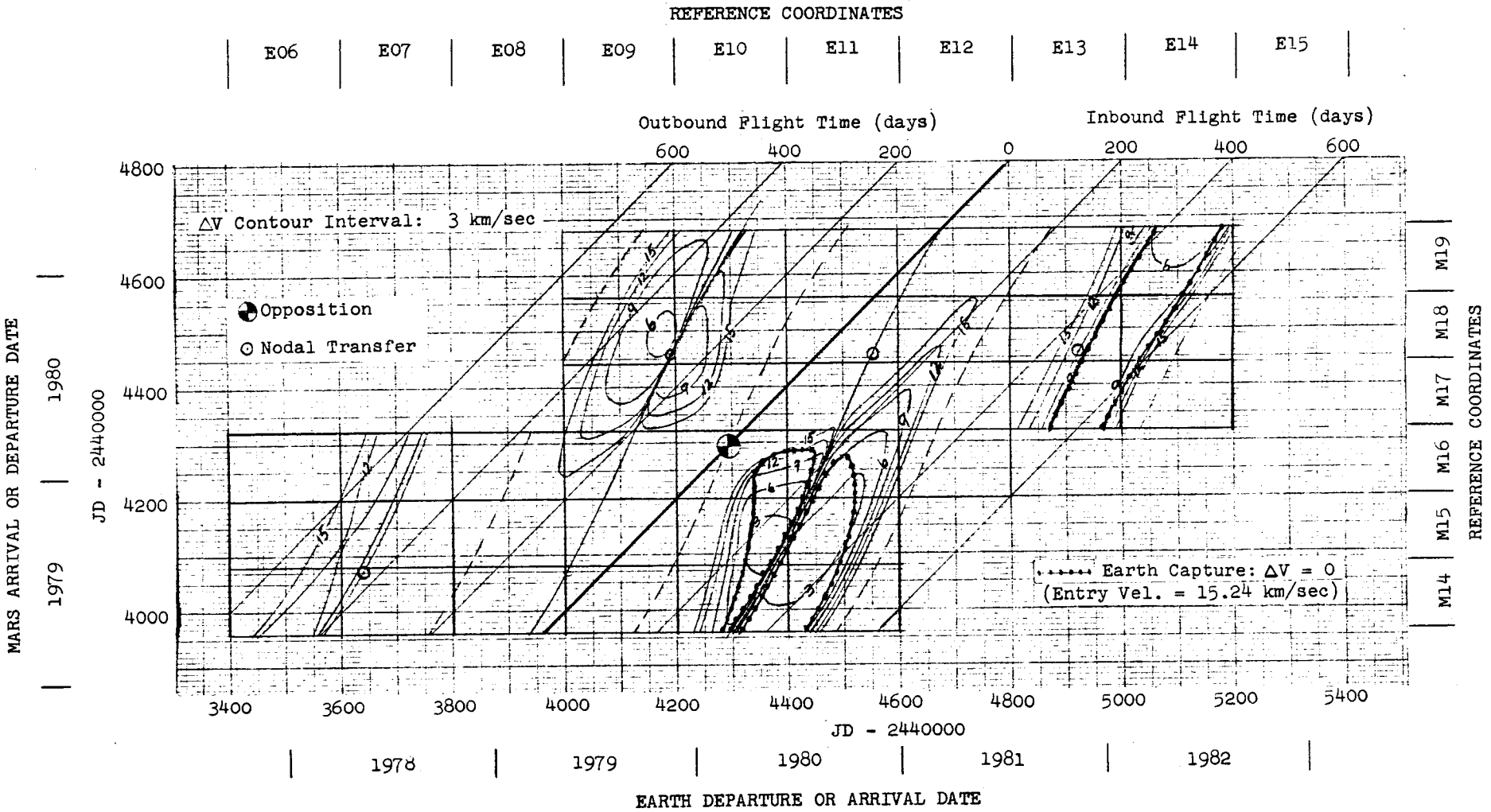

FIGURE 2 ΔV CONTOUR CHART, ONE-WAY TOTAL ΔV, 1980 OPPOSITION PERIOD

M14
E06

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2443740.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671815	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.573	DEGREES
MEAN ANOM. AT EPOCH	=	225.408	DEGREES
DATE OF NODAL PASSAGE	=	2443774.888	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2443740.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338569	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.393	DEGREES
ARG. OF PERIHELION	=	286.273	DEGREES
MEAN ANOM. AT EPOCH	=	249.666	DEGREES
DATE OF NODAL PASSAGE	=	2443385.560	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.055	DEGREES

M14
E06

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD 2444080.5	1181	1242	1302	1363	1423	1482	0	1288	962	722	556	438	351	284	232	192	164	148	145	154	173
1979 JUL 26.0	993	1031	1070	1108	1146	1185	0	1049	823	659	551	478	428	394	371	355	345	339	338	339	344
JD 2444070.5	1213	1274	1334	1394	1454	1513	1443	1087	806	611	476	378	304	247	203	171	150	143	148	163	186
1979 JUL 16.0	1020	1058	1097	1136	1174	1212	1167	915	719	588	502	444	404	376	358	346	339	336	336	340	346
JD 2444060.5	1246	1306	1366	1426	1485	0	1229	905	675	518	408	326	263	215	179	154	142	143	155	175	201
1979 JUL 6.0	1046	1085	1124	1163	1202	0	1021	791	632	529	460	414	382	361	346	338	333	333	335	341	349
JD 2444050.5	1279	1339	1398	1458	1516	1380	1019	749	567	440	349	281	228	188	159	143	139	148	165	189	218
1979 JUN 26.0	1073	1112	1152	1191	1229	1137	876	685	560	479	425	388	363	347	336	331	329	330	335	343	353
JD 2444040.5	1312	1371	1431	1489	0	1151	836	622	477	375	300	242	198	166	145	138	142	157	179	206	238
1979 JUN 16.0	1100	1139	1179	1218	0	975	747	597	501	438	395	366	347	334	327	324	325	329	335	345	357
JD 2444030.5	1345	1404	1463	1521	1296	939	686	519	404	320	258	209	174	149	137	138	149	169	195	226	262
1979 JUN 6.0	1126	1166	1205	1245	1086	822	641	526	452	403	369	347	332	324	319	319	322	328	336	348	364
JD 2444020.5	1378	1437	1495	1446	1057	762	567	436	343	274	222	182	154	138	135	143	161	185	214	248	307
1979 MAY 27.0	1152	1192	1232	1202	911	694	555	468	411	373	347	330	319	314	312	314	319	327	338	353	383
JD 2444010.5	1412	1470	0	1192	851	622	472	368	292	235	192	161	141	134	138	153	175	202	235	282	866
1979 MAY 17.0	1178	1218	0	1013	757	591	487	420	377	347	327	315	308	305	306	310	317	327	341	364	755
JD 2444000.5	1445	1503	1338	955	687	513	396	312	250	203	168	145	134	135	146	166	192	223	263	387	404
1979 MAY 7.0	1203	1243	1124	833	633	510	432	381	347	325	310	302	298	297	301	307	316	329	348	420	410
JD 2443990.5	1479	1484	1076	763	560	427	335	267	216	177	150	135	132	140	158	181	211	248	317	841	363
1979 APR 27.0	1227	1238	923	686	538	446	387	348	322	305	295	290	288	290	296	304	316	333	370	703	383
JD 2443980.5	1512	1212	853	616	464	360	285	229	187	157	138	131	136	150	172	199	233	285	675	382	374
1979 APR 17.0	1250	1025	749	572	463	395	350	321	301	288	281	279	280	284	292	302	317	344	604	387	383
JD 2443970.5	1357	959	682	506	389	306	245	199	165	142	131	132	143	162	188	220	263	390	501	367	393
1979 APR 7.0	1135	825	614	485	405	354	319	297	282	273	269	269	272	279	288	302	323	399	455	371	386
JD 2443960.5	1082	760	555	422	330	263	212	175	147	133	129	137	154	177	206	244	317	1335	371	379	414
1979 MAR 28.0	915	666	513	419	359	319	293	276	265	260	258	260	265	274	286	303	344	1078	365	370	391
(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)

JD2443400.5
1977 SEP 14.0

JD2443440.5
1977 OCT 24.0

JD2443480.5
1977 DEC 3.0

JD2443520.5
1978 JAN 12.0

JD2443560.5
1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

M14
E06

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

	(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD 2444080.5	-124	-98	-71	-43	-14	14	0	-236	-237	-237	-238	-238	-237	-237	-238	-241	-243	-244	-239	-230	-224
1979 JUL 26.0	3291	3360	3428	3496	3564	32	0	2725	2696	2695	2714	2740	2766	2784	2788	2768	2718	2638	2547	2471	2425
JD 2444070.5	-130	-105	-78	-50	-20	8	-233	-231	-231	-231	-232	-232	-232	-232	-231	-231	-227	-219	-207	-196	-191
1979 JUL 16.0	3277	3346	3415	3483	3551	19	2685	2642	2628	2639	2662	2689	2711	2720	2710	2671	2602	2514	2431	2375	2350
JD 2444060.5	-135	-111	-84	-56	-27	0	-225	-222	-221	-222	-223	-223	-223	-221	-217	-211	-199	-183	-168	-159	-155
1979 JUL 6.0	3262	3332	3401	3469	3537	0	2595	2566	2567	2586	2611	2635	2650	2647	2620	2562	2480	2394	2329	2295	2289
JD 2444050.5	-141	-116	-90	-62	-33	-218	-211	-209	-209	-211	-211	-211	-208	-203	-193	-178	-159	-140	-126	-119	-115
1979 JUN 26.0	3248	3318	3387	3456	3524	2554	2510	2499	2511	2534	2559	2577	2581	2564	2518	2444	2358	2286	2243	2229	2239
JD 2444040.5	-147	-122	-96	-68	0	-200	-194	-193	-195	-196	-196	-193	-187	-176	-158	-135	-111	-94	-84	-78	-67
1979 JUN 16.0	3233	3304	3373	3442	0	2461	2435	2439	2458	2482	2503	2513	2505	2470	2406	2324	2247	2194	2172	2176	2201
JD 2444030.5	-152	-128	-102	-75	-189	-178	-175	-176	-177	-178	-175	-169	-157	-137	-111	-83	-61	-48	-40	-31	1
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JD 2444020.5	-157	-134	-108	-179	-163	-155	-154	-156	-157	-155	-149	-137	-116	-88	-56	-29	-12	-3	5	29	144
1979 MAY 27.0	3203	3274	3344	2382	2327	2307	2314	2334	2356	2374	2379	2364	2322	2254	2175	2108	2068	2056	2070	2105	2174
JD 2444010.5	-163	-140	0	-148	-134	-131	-132	-133	-133	-127	-116	-95	-65	-30	0	21	33	42	59	127	657
1979 MAY 17.0	3187	3259	0	2282	2248	2247	2263	2284	2304	2314	2307	2276	2217	2142	2070	2021	2001	2007	2036	2094	2033
JD 2444000.5	-168	-145	-135	-114	-106	-106	-108	-108	-104	-93	-73	-43	-6	29	55	69	78	92	136	362	-429
1979 MAY 7.0	3172	3244	2244	2195	2183	2194	2214	2235	2249	2249	2227	2179	2109	2035	1977	1948	1947	1970	2018	2119	1787
JD 2443990.5	-173	-123	-96	-82	-79	-81	-82	-79	-70	-51	-22	16	55	86	104	114	126	156	276	-457	-273
1979 APR 27.0	3156	2209	2148	2124	2128	2145	2166	2183	2189	2177	2139	2077	2002	1938	1899	1889	1904	1945	2025	1212	1903
JD 2443980.5	-177	-79	-59	-52	-52	-54	-53	-45	-29	-2	36	78	114	137	149	159	180	254	655	-336	-202
1979 APR 17.0	3140	2107	2069	2064	2078	2099	2118	2129	2124	2097	2044	1972	1902	1853	1834	1841	1874	1939	2035	1743	1915
JD 2443970.5	-65	-37	-26	-24	-26	-25	-20	-7	17	54	98	139	166	181	191	207	255	457	-437	-216	-161
1979 APR 7.0	2071	2019	2004	2013	2033	2053	2068	2070	2052	2009	1944	1871	1812	1782	1780	1805	1858	1975	1456	1807	1909
JD 2443960.5	-18	-0	3	2	1	4	15	36	70	114	159	192	211	222	235	267	384	-286	-253	-154	-132
1979 MAR 28.0	1975	1948	1950	1967	1989	2006	2014	2006	1983	1916	1843	1776	1734	1722	1737	1781	1870	920	1679	1815	1897
	(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E06

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

	(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD 2444080.5		-27	-18	-9	0	9	19	0	-2	-46	-75	-95	-108	-118	-124	-129	-132	-134	-135	-134	-133	-130
1979 JUL 26.0		3552	3570	3588	6	25	44	0	8	3528	3476	3443	3423	3410	3401	3395	3391	3389	3388	3388	3389	3391
JD 2444070.5		-44	-35	-26	-16	-7	1	0	-48	-83	-106	-122	-133	-141	-147	-151	-154	-156	-156	-156	-155	-153
1979 JUL 16.0		3513	3531	3549	3567	3586	5	2	3507	3443	3403	3379	3364	3354	3347	3343	3341	3339	3340	3341	3343	3347
JD 2444060.5		-61	-52	-43	-34	-24	0	-48	-89	-116	-134	-147	-156	-163	-168	-172	-175	-176	-177	-177	-177	-176
1979 JUL 6.0		3473	3491	3509	3528	3547	0	3492	3413	3364	3334	3316	3305	3298	3293	3291	3289	3289	3291	3293	3297	3302
JD 2444050.5		-78	-69	-60	-51	-42	-45	-92	-123	-144	-159	-169	-177	-184	-188	-192	-195	-197	-198	-199	-200	-202
1979 JUN 26.0		3432	3451	3469	3488	3507	3482	3387	3326	3289	3268	3255	3247	3242	3239	3237	3237	3239	3241	3245	3250	3257
JD 2444040.5		-95	-86	-78	-69	0	-93	-129	-153	-169	-181	-190	-197	-203	-208	-211	-214	-217	-219	-221	-225	-234
1979 JUN 16.0		3391	3410	3428	3447	0	3366	3290	3245	3219	3203	3194	3188	3185	3184	3183	3185	3187	3190	3195	3203	3213
JD 2444030.5		-112	-103	-95	-86	-92	-133	-159	-177	-190	-200	-208	-215	-221	-226	-230	-233	-236	-240	-245	-254	-277
1979 JUN 6.0		3349	3368	3387	3406	3352	3258	3201	3169	3150	3139	3133	3130	3128	3128	3129	3131	3134	3139	3146	3156	3174
JD 2444020.5		-128	-120	-111	-90	-134	-164	-183	-197	-208	-217	-225	-231	-237	-242	-247	-251	-256	-262	-271	-291	-364
1979 MAY 27.0		3305	3325	3344	3342	3231	3160	3120	3097	3084	3077	3072	3070	3070	3071	3073	3076	3081	3087	3097	3112	3159
JD 2444010.5		-143	-136	0	-135	-167	-187	-202	-214	-223	-232	-239	-246	-252	-258	-263	-269	-276	-286	-304	-353	-552
1979 MAY 17.0		3261	3281	0	3211	3127	3071	3043	3027	3019	3014	3012	3011	3012	3013	3016	3021	3027	3035	3048	3078	5
JD 2444000.5		-158	-151	-134	-168	-190	-205	-216	-227	-236	-244	-251	-258	-265	-272	-278	-286	-297	-314	-351	-502	22
1979 MAY 7.0		3217	3237	3196	3088	3024	2989	2970	2960	2954	2952	2951	2951	2953	2955	2959	2964	2972	2983	3004	3120	2961
JD 2443990.5		-173	-134	-168	-190	-205	-217	-227	-236	-245	-254	-262	-269	-277	-285	-293	-304	-321	-352	-443	297	-109
1979 APR 27.0		3171	3185	3060	2980	2937	2914	2901	2894	2891	2890	2890	2891	2893	2896	2901	2908	2917	2933	2983	3028	2916
JD 2443980.5		-186	-168	-190	-204	-215	-225	-234	-244	-252	-261	-270	-278	-287	-297	-308	-324	-351	-415	-646	-28	-156
1979 APR 17.0		3124	3039	2941	2886	2857	2842	2834	2830	2828	2828	2829	2831	2833	2837	2842	2850	2862	2890	3305	2859	2869
JD 2443970.5		-169	-189	-201	-211	-220	-229	-239	-248	-257	-267	-276	-286	-296	-308	-324	-348	-398	-560	140	-120	-181
1979 APR 7.0		3024	2906	2838	2802	2784	2774	2769	2767	2766	2767	2768	2770	2773	2777	2783	2792	2810	2905	2838	2807	2819
JD 2443960.5		-188	-198	-206	-213	-222	-231	-240	-250	-260	-270	-280	-291	-304	-320	-343	-383	-488	268	-57	-158	-196
1979 MAR 28.0		2878	2793	2749	2726	2715	2709	2707	2706	2706	2706	2708	2710	2713	2717	2724	2735	2770	3076	2753	2757	2768
	(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M14 E06

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD 2444080.5 1979 JUL 26.0	2080	2080	2080	2080	2080	2080	0	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080
JD 2444070.5 1979 JUL 16.0	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115
JD 2444060.5 1979 JUL 6.0	2146	2146	2146	2146	2146	0	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146
JD 2444050.5 1979 JUN 26.0	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173
JD 2444040.5 1979 JUN 16.0	2198	2198	2198	2198	0	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198
JD 2444030.5 1979 JUN 6.0	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220
JD 2444020.5 1979 MAY 27.0	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239
JD 2444010.5 1979 MAY 17.0	2257	2257	0	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257
JD 2444000.5 1979 MAY 7.0	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273
JD 2443990.5 1979 APR 27.0	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287
JD 2443980.5 1979 APR 17.0	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301
JD 2443970.5 1979 APR 7.0	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313
JD 2443960.5 1979 MAR 28.0	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325

(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)

JD2443400.5 1977 SEP 14.0	JD2443440.5 1977 OCT 24.0	JD2443480.5 1977 DEC 3.0	JD2443520.5 1978 JAN 12.0	JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E06

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD 2444080.5	270	270	270	270	270	270	0	270	270	270	270	270	270	270	270	270	270	270	270	270	270
1979 JUL 26.0	416	416	416	416	416	416	0	416	416	416	416	416	416	416	416	416	416	416	416	416	416
JD 2444070.5	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257
1979 JUL 16.0	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389
JD 2444060.5	244	244	244	244	244	0	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244
1979 JUL 6.0	363	363	363	363	363	0	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363
JD 2444050.5	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231
1979 JUN 26.0	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339
JD 2444040.5	217	217	217	217	0	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217
1979 JUN 16.0	315	315	315	315	0	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315
JD 2444030.5	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204
1979 JUN 6.0	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293
JD 2444020.5	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190
1979 MAY 27.0	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271
JD 2444010.5	176	176	0	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176
1979 MAY 17.0	249	249	0	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249
JD 2444000.5	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
1979 MAY 7.0	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228
JD 2443990.5	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148
1979 APR 27.0	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207
JD 2443980.5	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134
1979 APR 17.0	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187
JD 2443970.5	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
1979 APR 7.0	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167
JD 2443960.5	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105
1979 MAR 28.0	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146

(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)

JD2443400.5	JD2443440.5	JD2443480.5	JD2443520.5	JD2443560.5
1977 SEP 14.0	1977 OCT 24.0	1977 DEC 3.0	1978 JAN 12.0	1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E06

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD 2444080.5	627	530	431	333	233	133	0	3532	3431	3329	3228	3126	3024	2922	2820	2719	2618	2517	2417	2318	2219
1979 JUL 26.0	1436	1493	1550	1607	1664	1722	0	-1575	-1288	-1065	-886	-735	-599	-474	-357	-245	-137	-34	64	159	251
JD 2444070.5	572	474	376	277	178	78	3577	3477	3375	3274	3172	3070	2968	2866	2765	2663	2562	2462	2362	2262	2163
1979 JUL 16.0	1469	1526	1583	1640	1697	1755	-1721	-1402	-1151	-955	-793	-652	-523	-402	-288	-178	-74	26	123	217	306
JD 2444060.5	515	417	319	220	121	0	3521	3420	3319	3217	3115	3013	2912	2810	2708	2607	2506	2405	2305	2206	2107
1979 JUL 6.0	1503	1559	1616	1673	1730	0	-1530	-1245	-1028	-854	-705	-572	-448	-331	-220	-113	-10	87	182	274	361
JD 2444050.5	458	360	262	163	64	3564	3463	3362	3261	3160	3058	2956	2854	2752	2651	2549	2448	2348	2248	2148	2049
1979 JUN 26.0	1537	1593	1649	1706	1763	-1669	-1351	-1107	-917	-760	-621	-494	-374	-261	-152	-48	51	148	241	330	415
JD 2444040.5	399	302	203	105	0	3505	3405	3304	3203	3101	2999	2898	2796	2694	2592	2491	2390	2289	2189	2090	1991
1979 JUN 16.0	1571	1627	1683	1740	0	-1469	-1193	-985	-816	-671	-540	-418	-302	-192	-86	15	113	207	298	385	468
JD 2444030.5	340	242	144	46	3545	3446	3346	3245	3143	3042	2940	2838	2736	2635	2533	2432	2331	2230	2130	2031	1932
1979 JUN 6.0	1606	1661	1717	1774	-1599	-1289	-1056	-875	-723	-587	-462	-344	-232	-124	-21	78	173	265	354	439	520
JD 2444020.5	280	182	84	3582	3485	3386	3285	3185	3083	2982	2880	2778	2676	2574	2473	2371	2271	2170	2070	1971	1872
1979 MAY 27.0	1640	1696	1752	-1732	-1395	-1134	-936	-775	-635	-506	-386	-272	-163	-58	42	139	232	322	408	491	571
JD 2444010.5	219	122	0	3523	3425	3325	3224	3124	3022	2921	2819	2717	2615	2514	2412	2311	2210	2109	2009	1910	1815
1979 MAY 17.0	1675	1731	0	-1514	-1220	-1002	-830	-683	-551	-429	-313	-203	-96	5	104	198	290	377	462	543	617
JD 2444000.5	158	61	3559	3462	3363	3263	3163	3062	2961	2859	2758	2656	2554	2452	2350	2249	2148	2048	1948	1850	1747
1979 MAY 7.0	1710	1765	-1641	-1315	-1072	-887	-733	-597	-472	-355	-243	-135	-31	67	164	256	345	431	513	592	671
JD 2443990.5	96	3586	3498	3400	3301	3201	3101	3000	2899	2797	2695	2593	2492	2390	2288	2187	2086	1986	1886	1780	1686
1979 APR 27.0	1746	-1742	-1421	-1148	-947	-785	-644	-517	-397	-284	-175	-70	30	128	221	312	399	483	563	647	718
JD 2443980.5	36	3533	3436	3337	3238	3138	3038	2937	2836	2734	2633	2531	2429	2327	2226	2124	2024	1923	1827	1722	1623
1979 APR 17.0	1780	-1537	-1233	-1011	-839	-693	-562	-441	-326	-216	-110	-8	90	185	277	366	451	533	609	691	764
JD 2443970.5	3565	3471	3373	3274	3175	3075	2975	2874	2773	2671	2570	2468	2366	2264	2163	2061	1961	1862	1756	1659	1560
1979 APR 7.0	-1658	-1327	-1081	-896	-743	-609	-486	-369	-258	-151	-48	51	148	241	331	417	501	580	663	736	808
JD 2443960.5	3504	3408	3310	3211	3112	3012	2912	2811	2710	2608	2506	2404	2303	2201	2099	1998	1898	1782	1695	1596	1497
1979 MAR 28.0	-1433	-1158	-956	-796	-658	-532	-414	-302	-194	-90	10	108	203	294	382	467	548	641	707	780	852
(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E06

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD 2444080.5	16	18	21	26	36	62	0	121	49	31	24	19	17	15	15	14	14	15	16	18	21
1979 JUL 26.0	918	939	959	975	987	996	0	961	818	671	558	479	423	383	356	337	325	319	317	319	325
JD 2444070.5	4	5	6	8	12	27	93	17	10	7	5	5	4	4	4	4	4	4	4	5	6
1979 JUL 16.0	930	951	968	982	993	999	995	884	726	596	504	439	394	362	340	326	318	314	315	320	327
JD 2444060.5	28	33	41	58	104	0	159	71	46	35	29	26	23	22	22	22	23	25	28	34	43
1979 JUL 6.0	942	961	977	989	996	0	944	787	640	533	458	405	369	344	327	317	312	311	315	321	331
JD 2444050.5	56	68	91	143	362	633	170	100	72	58	50	45	42	40	40	42	44	49	57	70	95
1979 JUN 26.0	954	971	984	994	999	986	852	690	566	479	419	377	349	329	317	310	308	310	316	324	336
JD 2444040.5	91	116	168	321	0	354	175	118	91	76	67	62	59	58	59	62	68	77	93	120	178
1979 JUN 16.0	964	979	990	997	0	915	747	604	504	435	387	354	332	318	309	306	306	311	318	329	343
JD 2444030.5	136	186	306	957	803	287	177	131	107	92	83	78	76	77	80	85	95	112	140	195	334
1979 JUN 6.0	973	986	995	999	968	809	649	533	453	398	361	335	319	308	303	303	306	312	322	335	350
JD 2444020.5	199	299	638	3215	471	256	179	141	119	106	98	94	94	96	101	111	128	155	206	319	747
1979 MAY 27.0	982	992	998	996	874	700	566	474	412	369	340	320	308	301	299	301	307	316	327	342	359
JD 2444010.5	294	522	0	827	365	238	180	149	130	119	112	110	111	116	125	141	168	214	308	576	4604
1979 MAY 17.0	989	996	0	934	758	605	498	427	378	345	323	308	300	297	297	302	309	320	333	350	367
JD 2444000.5	461	1188	1798	526	312	226	181	155	139	130	126	126	129	138	153	177	219	299	491	1466	1381
1979 MAY 7.0	994	999	979	821	650	527	445	389	351	326	309	299	294	294	297	304	313	326	341	359	381
JD 2443990.5	837	7942	790	407	279	217	182	161	148	141	139	142	149	162	185	223	291	437	932	4426	706
1979 APR 27.0	998	997	885	702	560	465	402	359	330	311	299	292	290	292	298	306	318	332	349	372	393
JD 2443980.5	2514	1311	537	343	257	210	183	166	156	152	153	159	170	191	224	283	399	711	3402	1118	501
1979 APR 17.0	1000	942	760	600	490	417	368	335	313	299	291	287	288	293	300	311	324	340	358	382	406
JD 2443970.5	2787	727	421	302	240	205	183	170	164	163	167	177	195	224	275	369	587	1532	2182	668	400
1979 APR 7.0	983	824	646	520	436	380	342	317	300	290	285	284	287	294	303	316	331	348	371	394	420
JD 2443960.5	1036	520	353	273	227	200	184	174	171	173	181	197	223	266	343	505	1010	7706	940	491	340
1979 MAR 28.0	888	700	555	458	394	350	321	302	290	283	281	283	288	296	308	322	339	363	382	407	435
(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E06

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD 2444080.5	-136	-99	-66	-39	-19	-6	0	56	264	477	639	755	837	896	937	964	982	991	-991	-986	-975
1979 JUL 26.0	3192	3190	3183	3173	3158	3138	0	2854	2634	2417	2256	2142	2064	2009	1971	1945	1928	1918	1914	1913	1917
JD 2444070.5	-114	-79	-50	-27	-11	-1	7	168	395	581	715	809	875	922	954	975	987	-990	-987	-979	-964
1979 JUL 16.0	3177	3172	3163	3150	3132	3109	2897	2718	2484	2297	2165	2074	2011	1968	1938	1918	1906	1899	1898	1900	1905
JD 2444060.5	-93	-62	-36	-17	-4	0	81	305	515	669	777	853	906	943	968	982	989	-988	-981	-969	-951
1979 JUL 6.0	3161	3154	3142	3126	3105	0	2795	2560	2347	2194	2089	2016	1966	1932	1909	1894	1886	1883	1884	1888	1894
JD 2444050.5	-74	-46	-24	-9	-1	19	211	441	618	742	829	889	931	959	977	986	-987	-983	-972	-956	-935
1979 JUN 26.0	3144	3134	3119	3100	3076	2850	2642	2407	2229	2107	2024	1967	1927	1901	1884	1874	1869	1868	1871	1877	1885
JD 2444040.5	-56	-32	-14	-3	0	120	359	560	703	802	870	917	950	971	983	-986	-983	-975	-961	-942	-918
1979 JUN 16.0	3125	3112	3095	3073	0	2723	2476	2272	2131	2035	1969	1925	1894	1874	1862	1856	1854	1856	1861	1868	1877
JD 2444030.5	-41	-20	-7	-0	46	269	495	659	772	849	903	940	964	979	985	-984	-977	-965	-948	-926	-899
1979 JUN 6.0	3105	3089	3069	3044	2790	2553	2323	2160	2049	1974	1923	1889	1866	1851	1843	1840	1841	1845	1851	1860	1869
JD 2444020.5	-27	-11	-2	5	177	421	609	738	826	887	929	957	974	983	-984	-979	-969	-954	-933	-908	-878
1979 MAY 27.0	3083	3065	3041	2825	2634	2384	2195	2068	1982	1924	1885	1858	1841	1831	1827	1826	1829	1835	1843	1852	1863
JD 2444010.5	-17	-4	0	92	338	552	700	801	869	917	948	969	980	-983	-981	-972	-959	-940	-916	-888	-857
1979 MAY 17.0	3060	3038	0	2711	2455	2239	2091	1993	1927	1882	1852	1832	1821	1814	1813	1815	1820	1827	1836	1846	1855
JD 2444000.5	-8	-0	29	250	487	657	772	850	903	939	963	977	983	-982	-975	-963	-946	-925	-898	-867	-830
1979 MAY 7.0	3035	3010	2768	2533	2291	2121	2007	1932	1881	1847	1825	1811	1803	1800	1801	1805	1811	1820	1829	1840	1853
JD 2443990.5	-2	4	160	413	608	739	828	888	929	956	973	982	-982	-978	-968	-952	-932	-908	-878	-841	-805
1979 APR 27.0	3008	2791	2614	2353	2157	2027	1941	1883	1844	1818	1802	1792	1788	1788	1791	1796	1804	1813	1823	1838	1848
JD 2443980.5	0	80	330	551	702	803	871	917	948	968	979	983	-980	-972	-958	-940	-917	-889	-858	-819	-778
1979 APR 17.0	2980	2687	2425	2202	2051	1953	1887	1843	1813	1794	1782	1776	1775	1777	1782	1789	1797	1807	1817	1832	1843
JD 2443970.5	24	242	485	658	774	851	904	940	963	977	983	-981	-975	-964	-947	-926	-900	-870	-832	-794	-750
1979 APR 7.0	2739	2505	2256	2083	1969	1894	1844	1810	1788	1774	1766	1763	1764	1768	1774	1782	1792	1802	1816	1827	1839
JD 2443960.5	153	410	608	740	829	888	929	956	973	98[illegible]	-983	-978	-969	-954	-935	-911	-882	-842	-809	-767	-721
1979 MAR 28.0	2586	2321	2122	1990	1904	1847	1808	1783	1766	1757	1752	1752	1755	1760	1767	1776	1787	1805	1811	1823	1835
(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)

JD2443400.5
1977 SEP 14.0

JD2443440.5
1977 OCT 24.0

JD2443480.5
1977 DEC 3.0

JD2443520.5
1978 JAN 12.0

JD2443560.5
1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E06

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD 2444080.5	124	122	121	119	118	118	0	1081	502	379	328	300	281	266	254	243	233	223	215	206	198
1979 JUL 26.0	278	274	270	267	264	261	0	415	410	402	394	385	376	366	357	348	339	329	320	311	302
JD 2444070.5	123	122	120	119	118	117	3090	627	415	345	310	289	273	260	248	238	228	219	210	202	194
1979 JUL 16.0	275	271	268	264	261	259	416	412	405	397	388	379	370	360	351	342	333	323	314	305	296
JD 2444060.5	122	121	120	119	118	0	902	470	366	322	297	279	265	253	242	233	223	214	206	198	190
1979 JUL 6.0	272	268	265	262	259	0	414	407	400	391	382	373	364	354	345	336	326	317	308	299	290
JD 2444050.5	122	120	119	118	118	1842	562	395	336	306	286	271	258	247	237	228	218	210	202	194	186
1979 JUN 26.0	269	266	263	260	257	415	410	402	394	385	376	367	357	348	339	329	320	311	302	293	284
JD 2444040.5	121	120	119	118	0	741	436	354	316	293	277	264	252	242	232	223	214	205	197	189	182
1979 JUN 16.0	267	263	260	257	0	411	405	397	388	379	370	361	351	342	332	323	314	305	296	287	278
JD 2444030.5	120	119	118	118	1196	501	376	328	301	283	269	257	246	236	227	218	209	201	193	185	178
1979 JUN 6.0	264	261	258	255	413	407	400	391	382	373	364	354	345	335	326	317	308	299	290	281	272
JD 2444020.5	120	119	118	3553	614	406	341	310	290	275	262	251	241	231	222	213	205	196	189	181	174
1979 MAY 27.0	261	258	256	414	409	402	394	385	376	367	357	348	338	329	320	310	301	292	283	275	266
JD 2444010.5	119	118	0	845	451	359	319	297	280	267	255	245	235	226	217	208	200	192	184	177	170
1979 MAY 17.0	259	256	0	411	404	396	388	379	369	360	351	341	332	322	313	304	295	286	277	268	260
JD 2444000.5	119	118	1500	521	381	331	304	286	272	260	249	239	230	221	212	204	195	188	180	173	166
1979 MAY 7.0	256	254	412	406	399	390	381	372	363	353	344	335	325	316	307	298	288	280	271	262	254
JD 2443990.5	118	4157	646	412	344	312	292	277	265	253	243	234	224	216	207	199	191	183	176	168	161
1979 APR 27.0	254	412	408	401	393	384	375	366	356	347	337	328	319	309	300	291	282	273	264	256	247
JD 2443980.5	118	911	457	361	321	299	282	269	258	247	238	228	219	211	202	194	186	179	172	164	157
1979 APR 17.0	251	409	403	395	386	377	368	359	349	340	331	321	312	303	293	284	276	267	258	249	241
JD 2443970.5	1671	530	383	332	306	288	274	262	251	241	232	223	214	206	197	189	182	174	167	160	153
1979 APR 7.0	410	405	397	389	380	371	361	352	343	333	324	314	305	296	287	278	269	260	251	243	235
JD 2443960.5	662	414	345	314	294	279	267	256	245	236	227	218	209	201	193	185	177	169	163	156	149
1979 MAR 28.0	406	399	391	382	373	364	355	345	336	326	317	308	298	289	280	271	262	253	245	237	229

(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

M14
E06

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD 2444080.5 1979 JUL 26.0	772	772	772	772	772	772	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444070.5 1979 JUL 16.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444060.5 1979 JUL 6.0	772	772	772	772	772	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444050.5 1979 JUN 26.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444040.5 1979 JUN 16.0	772	772	772	772	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444030.5 1979 JUN 6.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444020.5 1979 MAY 27.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444010.5 1979 MAY 17.0	772	772	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444000.5 1979 MAY 7.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2443990.5 1979 APR 27.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2443980.5 1979 APR 17.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2443970.5 1979 APR 7.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2443960.5 1979 MAR 28.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772

(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)

JD2443400.5 1977 SEP 14.0 JD2443440.5 1977 OCT 24.0 JD2443480.5 1977 DEC 3.0 JD2443520.5 1978 JAN 12.0 JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

M14
E06

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD 2444080.5	2912	3084	3258	3432	3605	3776	0	3217	2295	1641	1212	929	739	609	520	460	424	405	402	412	435
1979 JUL 26.0	2671	2784	2897	3010	3123	3236	0	2837	2170	1694	1380	1173	1033	938	873	829	801	787	782	787	799
JD 2444070.5	3003	3176	3349	3522	3694	3864	3664	2646	1866	1351	1017	796	646	545	476	432	408	399	405	423	452
1979 JUL 16.0	2749	2863	2977	3092	3205	3318	3184	2443	1869	1488	1240	1076	964	888	837	804	785	777	778	788	805
JD 2444060.5	3096	3268	3441	3613	3784	0	3047	2135	1516	1119	861	689	572	494	443	412	399	399	413	438	473
1979 JUL 6.0	2828	2943	3058	3173	3287	0	2755	2079	1616	1318	1123	993	905	845	806	782	771	769	776	791	813
JD 2444050.5	3190	3362	3534	3705	3873	3482	2454	1712	1238	935	736	603	514	455	418	400	396	405	425	457	499
1979 JUN 26.0	2907	3023	3139	3254	3368	3096	2328	1768	1408	1176	1024	922	853	807	778	763	758	763	775	796	823
JD 2444040.5	3284	3456	3627	3797	0	2825	1948	1378	1020	790	638	537	469	426	402	389	389	415	443	481	530
1979 JUN 16.0	2985	3102	3219	3334	0	2618	1951	1514	1238	1059	940	861	808	774	754	746	748	758	776	802	836
JD 2444030.5	3380	3551	3721	3888	3239	2229	1545	1120	852	678	562	485	436	407	394	394	407	431	465	510	571
1979 JUN 6.0	3063	3181	3298	3413	2944	2170	1641	1309	1099	961	869	808	768	744	733	732	740	755	779	810	855
JD 2444020.5	3476	3646	3814	3672	2561	1746	1238	924	723	591	504	447	413	395	392	400	420	450	492	547	652
1979 MAY 27.0	3140	3258	3375	3287	2430	1794	1394	1144	984	878	808	762	733	718	714	719	733	754	783	824	908
JD 2444010.5	3573	3741	0	2943	1987	1378	1007	775	624	525	461	420	398	390	395	411	438	475	525	605	2029
1979 MAY 17.0	3216	3334	0	2729	1979	1496	1199	1011	869	808	755	721	702	695	697	708	727	755	792	854	1973
JD 2444000.5	3670	3836	3359	2275	1546	1105	835	662	550	476	429	402	390	391	403	426	460	506	572	817	854
1979 MAY 7.0	3290	3408	3058	2201	1619	1264	1043	902	809	748	708	685	675	674	683	699	724	758	810	1009	983
JD 2443990.5	3766	3782	2614	1749	1222	905	706	578	495	441	408	391	388	397	416	446	487	546	671	1961	766
1979 APR 27.0	3361	3393	2465	1770	1343	1083	918	811	741	696	668	653	650	656	670	692	723	768	871	1820	908
JD 2443980.5	3862	2999	1994	1364	988	758	611	516	454	415	394	387	392	408	434	471	522	610	1516	806	788
1979 APR 17.0	3430	2766	1955	1441	1132	940	817	736	683	650	632	625	628	639	659	687	727	799	1533	916	907
JD 2443970.5	3413	2287	1534	1088	819	650	541	470	425	399	387	388	400	422	455	501	571	822	1077	773	828
1979 APR 7.0	3091	2178	1563	1194	968	826	733	672	633	611	600	600	608	625	650	685	742	951	1109	873	916
JD 2443960.5	2631	1742	1209	892	697	571	490	437	405	389	386	394	412	440	481	540	672	3352	782	799	876
1979 MAR 28.0	2442	1714	1272	1006	840	733	663	618	590	575	572	577	590	612	643	690	800	2921	858	870	927

(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)

JD2443400.5
1977 SEP 14.0

JD2443440.5
1977 OCT 24.0

JD2443480.5
1977 DEC 3.0

JD2443520.5
1978 JAN 12.0

JD2443560.5
1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E06

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

	(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD 2444080.5		5583	5868	6155	6442	6728	7012	0	6054	4465	3335	2592	2102	1772	1547	1392	1289	1225	1192	1184	1199	1234
1979 JUL 26.0		627	530	431	333	233	133	0	3532	3431	3329	3228	3126	3024	2922	2820	2719	2618	2517	2417	2318	2219
JD 2444070.5		5753	6039	6327	6614	6899	7181	6848	5088	3735	2839	2257	1872	1611	1433	1313	1236	1193	1176	1183	1211	1257
1979 JUL 16.0		572	474	376	277	178	78	3577	3477	3375	3274	3172	3070	2968	2866	2765	2663	2562	2462	2362	2262	2163
JD 2444060.5		5924	6211	6499	6786	7071	0	5802	4214	3132	2436	1984	1682	1477	1339	1248	1194	1169	1169	1189	1229	1286
1979 JUL 6.0		515	417	319	220	121	0	3521	3420	3319	3217	3115	3013	2912	2810	2708	2607	2506	2405	2305	2206	2107
JD 2444050.5		6097	6385	6673	6959	7242	6578	4782	3481	2646	2111	1760	1525	1367	1262	1197	1163	1154	1168	1201	1252	1322
1979 JUN 26.0		458	360	262	163	64	3564	3463	3362	3261	3160	3058	2956	2854	2752	2651	2549	2448	2348	2248	2148	2049
JD 2444040.5		6270	6558	6846	7131	0	5444	3899	2892	2258	1849	1579	1397	1277	1200	1157	1140	1147	1174	1219	1283	1366
1979 JUN 16.0		399	302	203	105	0	3505	3405	3304	3203	3101	2999	2898	2796	2694	2592	2491	2390	2289	2189	2090	1991
JD 2444030.5		6444	6732	7018	7302	6183	4399	3187	2430	1951	1639	1431	1293	1204	1151	1127	1126	1147	1186	1244	1320	1426
1979 JUN 6.0		340	242	144	46	3545	3446	3346	3245	3143	3042	2940	2838	2736	2635	2533	2432	2331	2230	2130	2031	1932
JD 2444020.5		6617	6904	7190	6960	4991	3540	2632	2068	1707	1469	1312	1209	1146	1113	1105	1119	1153	1204	1275	1371	1560
1979 MAY 27.0		280	182	84	3582	3485	3386	3285	3185	3083	2982	2880	2778	2676	2574	2473	2371	2271	2170	2070	1971	1872
JD 2444010.5		6789	7075	0	5672	3966	2874	2206	1786	1513	1333	1215	1141	1100	1085	1092	1119	1165	1230	1317	1459	4001
1979 MAY 17.0		219	122	0	3523	3425	3325	3224	3124	3022	2921	2819	2717	2615	2514	2412	2311	2210	2109	2009	1910	1815
JD 2444000.5		6959	7244	6417	4476	3166	2369	1878	1564	1359	1224	1138	1087	1065	1065	1086	1126	1184	1264	1382	1826	1837
1979 MAY 7.0		158	61	3559	3462	3363	3263	3163	3062	2961	2859	2758	2656	2554	2452	2350	2249	2148	2048	1948	1850	1747
JD 2443990.5		7127	7175	5078	3519	2566	1988	1625	1390	1236	1136	1076	1045	1038	1053	1086	1138	1211	1314	1541	3781	1673
1979 APR 27.0		96	3586	3498	3400	3301	3201	3101	3000	2899	2797	2695	2593	2492	2390	2288	2187	2086	1986	1886	1780	1686
JD 2443980.5		7292	6765	3948	2805	2120	1698	1428	1252	1137	1066	1026	1012	1020	1047	1092	1157	1249	1409	3049	1722	1695
1979 APR 17.0		36	3533	3436	3337	3238	3138	3038	2937	2836	2734	2633	2531	2429	2327	2226	2124	2024	1923	1827	1722	1623
JD 2443970.5		6504	4465	3097	2282	1788	1476	1274	1142	1059	1009	987	988	1008	1047	1105	1186	1313	1773	2186	1645	1744
1979 APR 7.0		3565	3471	3373	3274	3175	3075	2975	2874	2773	2671	2570	2468	2366	2264	2163	2061	1961	1862	1756	1659	1560
JD 2443960.5		5074	3456	2481	1898	1537	1304	1153	1055	995	965	957	970	1002	1052	1124	1230	1472	6273	1640	1668	1803
1979 MAR 28.0		3504	3408	3310	3211	3112	3012	2912	2811	2710	2608	2506	2404	2303	2201	2099	1998	1898	1782	1695	1596	1497
	(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

M14
E07

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2443840.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671803	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.578	DEGREES
MEAN ANOM. AT EPOCH	=	323.968	DEGREES
DATE OF NODAL PASSAGE	=	2443774.884	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2443840.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338595	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.395	DEGREES
ARG. OF PERIHELION	=	286.276	DEGREES
MEAN ANOM. AT EPOCH	=	302.068	DEGREES
DATE OF NODAL PASSAGE	=	2443385.557	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.056	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E07

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD 2444080.5	173	198	228	262	302	337	378	422	468	516	568	621	678	737	799	863	930	999	1070	1143	1217
1979 JUL 26.0	344	351	361	372	387	405	423	444	467	493	520	550	583	617	654	693	733	776	820	866	913
JD 2444070.5	186	214	246	281	319	358	401	445	493	542	595	650	707	768	830	896	964	1034	1105	1179	1253
1979 JUL 16.0	346	355	366	380	395	414	434	456	481	508	538	569	603	639	677	717	759	803	848	895	944
JD 2444060.5	201	232	266	345	341	381	424	470	518	569	623	679	737	799	863	929	998	1069	1141	1216	1291
1979 JUL 6.0	349	360	373	416	404	423	445	470	496	524	555	588	624	661	701	742	786	831	878	926	975
JD 2444050.5	218	252	295	336	363	405	449	496	545	597	652	709	769	831	896	964	1033	1105	1178	1253	1329
1979 JUN 26.0	353	366	387	397	413	434	457	483	511	541	574	608	645	684	725	768	813	860	908	957	1007
JD 2444040.5	238	278	900	350	387	429	474	522	573	626	682	740	801	865	931	999	1070	1142	1216	1292	1368
1979 JUN 16.0	357	375	742	402	422	445	470	497	527	559	593	629	667	708	750	795	841	889	938	989	1040
JD 2444030.5	262	373	350	371	411	454	501	550	601	656	713	772	835	899	967	1036	1107	1181	1256	1331	1323
1979 JUN 6.0	364	426	397	410	432	456	483	512	543	576	612	650	690	732	776	822	870	919	969	1021	984
JD 2444020.5	307	466	359	394	435	480	528	578	631	687	745	806	869	935	1003	1074	1146	1220	1296	1372	1137
1979 MAY 27.0	383	453	399	419	442	468	496	527	560	595	632	671	713	757	802	850	899	949	1001	1054	830
JD 2444010.5	866	358	379	418	461	507	556	607	662	718	778	840	905	972	1041	1112	1186	1261	1337	1240	972
1979 MAY 17.0	755	392	405	428	453	480	510	542	577	613	652	693	737	782	829	878	928	980	1033	925	684
JD 2444000.5	404	367	401	442	487	535	585	638	693	751	812	875	941	1009	1080	1152	1226	1302	1379	1054	849
1979 MAY 7.0	410	393	413	437	463	493	524	558	594	632	673	716	761	807	856	906	958	1012	1066	763	569
JD 2443990.5	363	386	425	468	514	563	614	669	725	785	847	912	979	1048	1119	1193	1268	1344	1148	906	770
1979 APR 27.0	383	398	420	446	474	505	538	574	612	652	694	738	785	833	884	935	989	1044	849	626	492
JD 2443980.5	374	408	449	494	542	592	645	700	759	820	883	949	1017	1088	1160	1235	1311	1247	975	807	727
1979 APR 17.0	383	403	428	456	486	518	553	590	630	671	715	761	810	860	911	965	1020	939	692	530	451
JD 2443970.5	393	432	475	521	570	622	676	733	793	855	920	987	1057	1128	1202	1278	1355	1056	853	751	710
1979 APR 7.0	386	409	436	465	497	531	568	607	648	691	737	785	834	886	939	995	1051	766	575	476	443
JD 2443960.5	414	456	501	549	599	652	708	767	828	892	958	1026	1097	1170	1245	1322	1147	910	781	727	715
1979 MAR 28.0	391	416	444	475	508	544	582	623	666	711	759	808	859	913	968	1025	847	627	505	459	463
(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E07

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

	(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD 2444080.5		-224	-222	-227	-241	-321	-187	-216	-225	-228	-227	-223	-216	-205	-191	-175	-156	-135	-113	-89	-64	-38
1979 JUL 26.0		2425	2410	2418	2444	2469	2542	2595	2655	2719	2785	2853	2921	2990	3058	3125	3191	3257	3321	3384	3446	3508
JD 2444070.5		-191	-191	-194	-195	-240	-227	-230	-233	-235	-233	-229	-221	-211	-197	-181	-163	-143	-120	-97	-72	-46
1979 JUL 16.0		2350	2352	2374	2410	2449	2506	2566	2629	2695	2763	2832	2901	2970	3039	3107	3174	3239	3303	3367	3429	3490
JD 2444060.5		-155	-153	-144	103	-255	-237	-237	-238	-239	-237	-233	-226	-216	-203	-188	-170	-150	-128	-105	-80	-55
1979 JUL 6.0		2289	2305	2340	2412	2411	2474	2538	2603	2671	2740	2810	2881	2951	3020	3088	3155	3221	3286	3349	3411	3472
JD 2444050.5		-115	-104	-22	-353	-250	-239	-239	-240	-241	-240	-237	-230	-221	-208	-193	-176	-157	-135	-113	-89	-64
1979 JUN 26.0		2239	2270	2326	2280	2379	2445	2511	2579	2648	2718	2789	2860	2931	3000	3069	3136	3202	3267	3330	3392	3453
JD 2444040.5		-67	-18	-517	-280	-242	-237	-238	-241	-243	-242	-239	-234	-225	-213	-199	-182	-164	-143	-121	-97	-73
1979 JUN 16.0		2201	2249	1351	2274	2351	2418	2486	2555	2625	2696	2768	2839	2910	2980	3049	3117	3183	3248	3311	3373	3434
JD 2444030.5		1	253	-357	-251	-234	-233	-236	-240	-243	-244	-241	-236	-229	-218	-204	-188	-170	-150	-129	-106	-212
1979 JUN 6.0		2176	2263	2133	2252	2324	2393	2461	2531	2602	2674	2746	2818	2890	2960	3029	3097	3163	3228	3291	3353	2530
JD 2444020.5		144	-537	-272	-231	-225	-228	-234	-239	-243	-244	-243	-239	-232	-222	-209	-194	-177	-158	-137	-114	-200
1979 MAY 27.0		2174	1754	2144	2229	2299	2368	2438	2509	2580	2652	2725	2797	2868	2939	3008	3076	3142	3207	3270	3332	2472
JD 2444010.5		657	-323	-233	-216	-216	-222	-230	-237	-241	-244	-244	-241	-235	-226	-214	-200	-183	-165	-145	-187	-189
1979 MAY 17.0		2033	2010	2130	2206	2276	2345	2415	2486	2558	2630	2703	2775	2847	2917	2987	3055	3121	3186	3249	2410	2429
JD 2444000.5		-429	-244	-207	-203	-208	-216	-226	-234	-240	-243	-244	-242	-237	-229	-219	-205	-190	-172	-153	-172	-181
1979 MAY 7.0		1787	2024	2112	2184	2254	2323	2393	2464	2536	2608	2681	2753	2825	2895	2965	3033	3099	3163	3226	2358	2401
JD 2443990.5		-273	-202	-188	-190	-199	-210	-221	-230	-238	-242	-244	-243	-239	-233	-223	-211	-196	-179	-154	-161	-176
1979 APR 27.0		1903	2016	2093	2163	2232	2302	2372	2443	2514	2586	2659	2731	2802	2873	2942	3010	3076	3140	2292	2322	2382
JD 2443980.5		-202	-173	-171	-179	-191	-204	-216	-226	-235	-241	-244	-244	-241	-235	-227	-215	-202	-136	-139	-154	-173
1979 APR 17.0		1915	2001	2074	2143	2212	2281	2351	2421	2493	2564	2636	2708	2779	2849	2918	2986	3052	2232	2249	2300	2369
JD 2443970.5		-161	-151	-157	-169	-183	-197	-210	-222	-232	-239	-243	-244	-242	-238	-230	-220	-208	-117	-130	-151	-171
1979 APR 7.0		1909	1985	2055	2123	2192	2260	2330	2400	2471	2542	2614	2685	2756	2825	2894	2961	3027	2181	2222	2285	2356
JD 2443960.5		-132	-133	-144	-158	-174	-190	-205	-218	-228	-236	-241	-244	-243	-240	-233	-224	-95	-104	-125	-149	-170
1979 MAR 28.0		1897	1969	2037	2105	2172	2240	2309	2379	2449	2520	2591	2661	2732	2801	2869	2936	2118	2147	2204	2271	2342
	(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E07

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

	(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD 2444080.5		-130	-126	-120	-111	-68	-132	-114	-104	-95	-86	-77	-68	-58	-48	-38	-27	-16	-4	7	19	32
1979 JUL 26.0		3391	3395	3399	3402	3393	3433	3436	3445	3456	3469	3482	3497	3513	3530	3548	3568	3588	10	32	56	81
JD 2444070.5		-153	-150	-147	-145	-121	-126	-121	-115	-108	-100	-92	-83	-74	-64	-54	-43	-31	-20	-7	4	17
1979 JUL 16.0		3347	3351	3357	3365	3365	3378	3389	3401	3413	3427	3441	3457	3474	3492	3511	3531	3552	3574	3597	22	47
JD 2444060.5		-176	-177	-182	-305	-126	-135	-133	-128	-122	-115	-107	-98	-89	-79	-69	-58	-47	-35	-23	-10	2
1979 JUL 6.0		3302	3308	3319	3406	3315	3331	3343	3356	3370	3385	3400	3417	3434	3453	3473	3493	3515	3538	3562	3587	13
JD 2444050.5		-202	-210	-254	-79	-140	-146	-145	-141	-136	-129	-122	-113	-104	-95	-85	-74	-63	-51	-38	-25	-12
1979 JUN 26.0		3257	3268	3300	3238	3269	3284	3298	3312	3326	3342	3358	3376	3394	3414	3434	3456	3478	3502	3527	3552	3579
JD 2444040.5		-234	-263	370	-129	-154	-159	-158	-155	-149	-143	-136	-128	-119	-110	-100	-89	-78	-66	-54	-40	-27
1979 JUN 16.0		3213	3236	3244	3202	3223	3238	3252	3267	3283	3299	3316	3335	3354	3374	3396	3418	3441	3466	3491	3518	3546
JD 2444030.5		-277	-418	-80	-154	-168	-172	-171	-168	-163	-157	-150	-142	-134	-125	-115	-104	-93	-81	-69	-55	0
1979 JUN 6.0		3174	3286	3129	3158	3176	3191	3206	3222	3238	3255	3274	3293	3313	3335	3357	3380	3404	3430	3456	3484	3570
JD 2444020.5		-364	117	-139	-172	-182	-184	-183	-180	-176	-170	-164	-156	-148	-139	-129	-119	-108	-96	-83	-70	-29
1979 MAY 27.0		3159	3060	3092	3112	3128	3143	3159	3176	3193	3211	3231	3251	3272	3294	3318	3342	3367	3394	3421	3449	3500
JD 2444010.5		-552	-94	-167	-187	-194	-196	-195	-192	-188	-183	-177	-170	-162	-153	-143	-133	-122	-110	-98	-41	-45
1979 MAY 17.0		5	3023	3047	3064	3079	3095	3112	3129	3148	3167	3187	3208	3231	3254	3278	3304	3330	3358	3386	3461	3460
JD 2444000.5		22	-149	-186	-199	-205	-207	-206	-203	-199	-195	-189	-182	-174	-166	-157	-147	-136	-124	-111	-63	-46
1979 MAY 7.0		2961	2981	2998	3014	3030	3047	3064	3082	3102	3122	3143	3166	3189	3213	3239	3265	3293	3322	3351	3404	3456
JD 2443990.5		-109	-176	-200	-210	-215	-216	-215	-213	-210	-205	-200	-193	-186	-178	-169	-159	-149	-137	-79	-70	-34
1979 APR 27.0		2916	2933	2949	2965	2981	2998	3016	3035	3055	3077	3099	3123	3147	3173	3200	3227	3256	3286	3356	3385	3484
JD 2443980.5		-156	-194	-211	-219	-223	-224	-224	-222	-219	-215	-210	-204	-197	-189	-181	-171	-161	-92	-91	-61	-12
1979 APR 17.0		2869	2883	2898	2914	2931	2949	2968	2988	3009	3031	3055	3080	3105	3132	3160	3189	3220	3316	3320	3405	3535
JD 2443970.5		-181	-206	-219	-226	-229	-231	-231	-229	-227	-223	-219	-213	-207	-200	-191	-182	-172	-109	-87	-42	11
1979 APR 7.0		2819	2833	2847	2863	2881	2899	2919	2940	2962	2986	3011	3036	3064	3092	3121	3152	3183	3262	3328	3453	3594
JD 2443960.5		-196	-214	-225	-231	-234	-236	-236	-235	-233	-230	-227	-222	-216	-209	-201	-192	-124	-110	-71	-18	33
1979 MAR 28.0		2768	2781	2796	2813	2831	2850	2871	2893	2916	2941	2967	2994	3022	3052	3083	3115	3211	3255	3371	3513	47
	(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M14 E07

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

	(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD 2444080.5 1979 JUL 26.0		2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080
JD 2444070.5 1979 JUL 16.0		2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115
JD 2444060.5 1979 JUL 6.0		2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146
JD 2444050.5 1979 JUN 26.0		2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173
JD 2444040.5 1979 JUN 16.0		2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198
JD 2444030.5 1979 JUN 6.0		2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220
JD 2444020.5 1979 MAY 27.0		2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239
JD 2444010.5 1979 MAY 17.0		2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257
JD 2444000.5 1979 MAY 7.0		2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273
JD 2443990.5 1979 APR 27.0		2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287
JD 2443980.5 1979 APR 17.0		2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301
JD 2443970.5 1979 APR 7.0		2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313
JD 2443960.5 1979 MAR 28.0		2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325
	(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E07

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD 2444080.5	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270
1979 JUL 26.0	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416
JD 2444070.5	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257
1979 JUL 16.0	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389
JD 2444060.5	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244
1979 JUL 6.0	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363
JD 2444050.5	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231
1979 JUN 26.0	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339
JD 2444040.5	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217
1979 JUN 16.0	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315
JD 2444030.5	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204
1979 JUN 6.0	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293
JD 2444020.5	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190
1979 MAY 27.0	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271
JD 2444010.5	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176
1979 MAY 17.0	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249
JD 2444000.5	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
1979 MAY 7.0	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228
JD 2443990.5	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148
1979 APR 27.0	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207
JD 2443980.5	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134
1979 APR 17.0	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187
JD 2443970.5	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
1979 APR 7.0	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167
JD 2443960.5	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105
1979 MAR 28.0	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146

(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E07

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD 2444080.5	2219	2121	2023	1926	1829	1732	1636	1541	1445	1350	1254	1159	1064	968	872	775	678	581	483	385	286
1979 JUL 26.0	251	339	424	505	583	659	732	803	872	939	1004	1068	1132	1194	1255	1316	1377	1438	1499	1560	1621
JD 2444070.5	2163	2065	1967	1870	1773	1677	1581	1485	1390	1294	1199	1104	1008	912	816	720	623	525	427	329	230
1979 JUL 16.0	306	392	475	555	632	706	777	847	914	980	1045	1108	1170	1232	1293	1353	1413	1474	1534	1595	1656
JD 2444060.5	2107	2008	1911	1814	1717	1620	1524	1429	1333	1238	1142	1047	951	856	760	663	566	469	371	272	173
1979 JUL 6.0	361	445	526	604	679	752	822	890	957	1022	1085	1147	1209	1270	1330	1390	1450	1510	1570	1630	1692
JD 2444050.5	2049	1951	1853	1756	1659	1563	1467	1371	1276	1180	1085	989	894	798	702	606	509	411	313	215	116
1979 JUN 26.0	415	497	576	653	726	798	866	933	999	1063	1125	1187	1247	1308	1367	1427	1486	1546	1606	1666	1728
JD 2444040.5	1991	1893	1792	1697	1601	1504	1408	1313	1217	1122	1026	931	836	740	644	547	450	353	255	157	58
1979 JUN 16.0	468	549	628	701	773	843	910	976	1040	1103	1165	1226	1286	1346	1405	1464	1523	1582	1642	1703	1764
JD 2444030.5	1932	1834	1735	1638	1541	1445	1349	1253	1158	1062	967	872	776	680	584	488	391	294	196	98	3592
1979 JUN 6.0	520	598	675	748	819	887	954	1018	1082	1144	1205	1265	1324	1384	1442	1501	1560	1619	1679	1739	-1784
JD 2444020.5	1872	1772	1675	1578	1481	1385	1289	1193	1098	1002	907	812	716	620	524	428	331	234	136	38	3537
1979 MAY 27.0	571	650	723	794	864	931	996	1060	1123	1184	1244	1304	1363	1421	1480	1538	1597	1656	1716	1776	-1687
JD 2444010.5	1815	1712	1614	1517	1420	1324	1228	1132	1037	941	846	751	655	559	463	367	270	173	75	3574	3477
1979 MAY 17.0	617	697	770	840	908	974	1039	1102	1163	1224	1284	1343	1401	1459	1518	1576	1634	1694	1753	-1750	-1604
JD 2444000.5	1747	1650	1553	1455	1359	1262	1166	1071	975	880	785	689	594	498	402	306	209	112	18	3514	3415
1979 MAY 7.0	671	744	815	885	952	1017	1080	1142	1203	1263	1323	1381	1439	1497	1555	1613	1672	1731	1789	-1653	-1549
JD 2443990.5	1686	1588	1490	1393	1296	1200	1104	1008	913	818	722	627	531	436	340	243	147	51	3549	3452	3353
1979 APR 27.0	718	790	860	928	994	1059	1121	1183	1243	1303	1361	1420	1477	1535	1593	1651	1710	1769	-1708	-1585	-1515
JD 2443980.5	1623	1525	1428	1330	1234	1137	1041	946	850	755	660	564	469	373	277	181	85	3579	3487	3389	3290
1979 APR 17.0	764	835	904	971	1036	1100	1162	1223	1283	1342	1400	1458	1516	1573	1631	1689	1748	-1761	-1625	-1542	-1492
JD 2443970.5	1560	1462	1365	1267	1171	1074	978	883	787	692	597	501	406	310	214	118	26	3521	3424	3326	3227
1979 APR 7.0	808	879	947	1013	1077	1140	1202	1262	1322	1380	1438	1496	1554	1611	1669	1727	1784	-1670	-1572	-1515	-1474
JD 2443960.5	1497	1399	1301	1204	1107	1011	915	819	724	629	533	438	343	247	151	57	3554	3459	3361	3263	3164
1979 MAR 28.0	852	921	989	1054	1118	1180	1241	1301	1360	1418	1476	1534	1591	1649	1707	1765	-1720	-1604	-1539	-1495	-1457
(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E07

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD 2444080.5	21	27	38	66	284	121	51	33	25	20	18	16	15	14	14	15	15	17	19	23	30
1979 JUL 26.0	325	334	346	361	379	400	424	451	481	514	549	587	627	670	713	758	802	846	887	924	956
JD 2444070.5	6	8	13	30	79	17	10	7	6	5	4	4	4	4	4	4	4	5	5	7	9
1979 JUL 16.0	327	338	352	369	389	412	437	466	497	532	568	608	649	693	737	782	826	868	907	942	970
JD 2444060.5	43	62	114	928	151	71	47	36	30	26	24	23	22	22	23	24	26	30	36	48	73
1979 JUL 6.0	331	344	360	378	400	424	452	482	515	551	589	630	672	716	761	806	849	890	927	958	982
JD 2444050.5	95	154	433	521	165	100	73	59	51	46	42	41	40	41	43	46	52	61	77	110	200
1979 JUN 26.0	336	351	368	389	412	438	467	499	534	571	611	653	696	741	786	830	872	911	945	973	992
JD 2444040.5	178	362	4816	328	171	118	92	78	69	63	60	58	59	61	65	71	82	101	136	216	581
1979 JUN 16.0	343	359	379	401	426	454	484	518	554	593	634	677	721	766	811	854	895	931	962	985	998
JD 2444030.5	334	1290	675	273	175	131	108	93	85	79	77	76	78	82	89	101	121	155	227	450	7677
1979 JUN 6.0	350	368	390	414	440	470	503	538	576	616	658	702	747	792	836	878	917	950	977	994	999
JD 2444020.5	747	1919	432	247	177	141	120	107	99	95	93	95	98	106	118	138	171	236	398	1414	860
1979 MAY 27.0	359	380	402	428	457	488	522	559	598	640	683	728	773	818	861	901	937	967	988	999	968
JD 2444010.5	4605	716	345	232	179	149	131	120	113	110	110	114	121	133	152	184	242	370	839	2480	515
1979 MAY 17.0	367	391	416	443	474	507	543	581	622	665	709	755	800	844	886	924	956	981	996	994	899
JD 2444000.5	1381	485	299	221	180	155	140	131	126	125	128	134	146	164	194	246	352	648	4374	837	395
1979 MAY 7.0	381	404	431	460	492	527	565	605	647	691	736	782	826	869	909	944	972	992	1000	942	827
JD 2443990.5	706	385	271	214	181	161	149	142	139	141	146	157	174	202	249	338	550	1594	1584	545	333
1979 APR 27.0	393	418	447	478	512	549	588	630	673	718	764	809	853	894	931	963	986	998	977	868	772
JD 2443980.5	501	329	251	208	182	166	156	152	152	157	166	182	208	250	326	489	1034	4749	777	422	295
1979 APR 17.0	406	433	464	497	533	571	612	655	700	745	791	836	879	918	952	978	995	996	910	805	737
JD 2443970.5	400	292	236	203	182	170	164	162	166	174	188	212	250	315	445	794	3856	1195	539	353	268
1979 APR 7.0	420	450	482	517	554	595	637	682	727	773	819	863	904	940	969	990	999	950	841	763	720
JD 2443960.5	340	266	224	198	183	174	171	173	180	192	213	247	304	410	657	1764	2175	703	423	309	248
1979 MAR 28.0	435	467	501	538	577	619	663	709	755	801	846	889	927	960	984	998	981	880	791	740	716
(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E07

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

	(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD 2444080.5		-975	-959	-937	-909	-877	-840	-798	-752	-701	-647	-590	-530	-469	-407	-345	-284	-226	-172	-123	-80	-45
1979 JUL 26.0		1917	1922	1931	1941	1952	1964	1978	1991	2004	2018	2030	2042	2052	2061	2067	2071	2071	2069	2062	2051	2035
JD 2444070.5		-964	-944	-919	-889	-854	-814	-770	-722	-669	-614	-555	-495	-433	-371	-310	-251	-195	-144	-98	-60	-30
1979 JUL 16.0		1905	1912	1921	1932	1944	1957	1970	1983	1997	2009	2021	2032	2041	2048	2052	2054	2053	2048	2038	2024	2005
JD 2444060.5		-951	-928	-900	-867	-829	-787	-740	-690	-636	-579	-519	-458	-397	-335	-275	-218	-165	-117	-75	-42	-17
1979 JUL 6.0		1894	1903	1913	1924	1937	1950	1963	1976	1989	2001	2012	2021	2029	2034	2037	2037	2033	2025	2013	1996	1974
JD 2444050.5		-935	-909	-878	-843	-802	-758	-709	-656	-601	-543	-482	-421	-360	-300	-241	-187	-136	-92	-55	-26	-7
1979 JUN 26.0		1885	1895	1906	1918	1930	1943	1956	1969	1981	1992	2002	2010	2016	2020	2021	2018	2012	2002	1986	1967	1941
JD 2444040.5		-918	-889	-854	-817	-774	-727	-676	-622	-565	-506	-445	-384	-323	-264	-208	-156	-109	-69	-37	-14	-1
1979 JUN 16.0		1877	1887	1900	1911	1924	1937	1950	1962	1973	1983	1992	1999	2003	2005	2004	1999	1990	1976	1958	1935	1907
JD 2444030.5		-899	-867	-830	-789	-744	-695	-642	-586	-528	-468	-407	-347	-287	-230	-176	-127	-84	-49	-22	-5	0
1979 JUN 6.0		1869	1880	1893	1905	1918	1931	1943	1955	1965	1974	1982	1987	1989	1989	1985	1978	1966	1950	1928	1902	1633
JD 2444020.5		-878	-842	-804	-760	-713	-661	-607	-550	-491	-430	-370	-310	-252	-196	-146	-100	-62	-31	-10	-0	26
1979 MAY 27.0		1863	1875	1887	1900	1912	1925	1936	1947	1957	1965	1970	1974	1975	1972	1966	1956	1941	1921	1897	1867	1576
JD 2444010.5		-857	-817	-776	-730	-680	-627	-571	-512	-453	-392	-332	-273	-217	-164	-117	-76	-42	-17	-3	5	80
1979 MAY 17.0		1855	1870	1882	1895	1907	1919	1930	1940	1948	1955	1959	1960	1959	1954	1945	1932	1914	1891	1863	1586	1504
JD 2444000.5		-830	-790	-746	-698	-646	-591	-534	-474	-414	-354	-295	-237	-183	-134	-90	-54	-25	-7	0	45	136
1979 MAY 7.0		1853	1865	1877	1889	1901	1913	1923	1932	1939	1944	1946	1946	1942	1934	1923	1907	1886	1860	1828	1521	1441
JD 2443990.5		-805	-762	-715	-665	-611	-555	-496	-436	-376	-316	-258	-203	-152	-106	-66	-35	-13	-1	18	103	180
1979 APR 27.0		1848	1860	1872	1885	1896	1906	1916	1923	1929	1932	1933	1930	1924	1914	1899	1880	1855	1826	1536	1453	1402
JD 2443980.5		-778	-733	-684	-631	-575	-518	-458	-398	-338	-279	-223	-170	-122	-80	-45	-19	-4	3	69	152	210
1979 APR 17.0		1843	1856	1868	1880	1890	1900	1908	1914	1919	1920	1918	1913	1904	1891	1874	1851	1823	1543	1469	1406	-1387
JD 2443970.5		-750	-702	-651	-596	-539	-480	-420	-360	-300	-243	-188	-139	-94	-57	-28	-8	0	38	122	186	228
1979 APR 7.0		1839	1851	1863	1874	1884	1893	1900	1905	1907	1907	1903	1895	1884	1868	1847	1821	1790	1485	1414	1385	-1395
JD 2443960.5		-721	-671	-617	-561	-502	-442	-382	-322	-263	-208	-156	-109	-69	-37	-14	-1	14	91	161	208	237
1979 MAR 28.0		1835	1847	1859	1869	1878	1886	1891	1894	1895	1892	1886	1876	1861	1842	1818	1789	1498	1426	1386	-1388	-1428
	(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)

JD2443600.5 1978 APR 2.0

JD2443640.5 1978 MAY 12.0

JD2443680.5 1978 JUN 21.0

JD2443720.5 1978 JUL 31.0

JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E07

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD 2444080.5	198	190	183	175	169	162	156	150	144	138	133	128	123	119	115	111	108	104	101	99	97
1979 JUL 26.0	302	293	285	276	268	259	251	244	236	228	221	214	207	201	194	188	182	177	172	166	162
JD 2444070.5	194	186	179	172	165	159	152	146	141	135	130	125	121	117	113	109	106	103	100	97	95
1979 JUL 16.0	296	287	279	270	262	254	246	238	230	223	216	209	202	196	190	184	178	173	167	162	158
JD 2444060.5	190	182	175	168	162	155	149	143	138	132	127	123	118	114	110	107	104	101	98	96	94
1979 JUL 6.0	290	282	273	265	256	248	240	233	225	218	211	204	197	191	185	179	174	168	163	158	154
JD 2444050.5	186	179	171	165	158	152	146	140	135	130	125	120	116	112	108	105	102	99	97	94	92
1979 JUN 26.0	284	276	267	259	251	243	235	227	220	213	206	199	193	186	180	175	169	164	159	154	150
JD 2444040.5	182	175	167	161	155	148	143	137	132	127	122	118	113	110	106	103	100	97	95	93	91
1979 JUN 16.0	278	270	261	253	245	237	229	222	214	207	201	194	188	182	176	170	165	160	155	150	146
JD 2444030.5	178	171	164	157	151	145	139	134	129	124	119	115	111	107	104	101	98	96	93	92	9999
1979 JUN 6.0	272	264	255	247	239	231	224	216	209	202	195	189	183	177	171	166	160	155	151	146	298
JD 2444020.5	174	167	160	154	147	142	136	131	126	121	117	112	109	105	102	99	96	94	92	90	1601
1979 MAY 27.0	266	257	249	241	233	226	218	211	204	197	190	184	178	172	166	161	156	151	147	142	293
JD 2444010.5	170	163	156	150	144	138	133	127	123	118	114	110	106	103	100	97	94	92	90	3652	904
1979 MAY 17.0	260	251	243	235	227	220	212	205	198	192	185	179	173	167	162	157	152	147	142	294	286
JD 2444000.5	166	159	152	146	140	135	129	124	120	115	111	107	104	101	98	95	93	91	89	1200	694
1979 MAY 7.0	254	245	237	229	222	214	207	200	193	186	180	174	168	163	157	152	147	143	138	288	279
JD 2443990.5	161	155	149	142	137	131	126	121	117	112	108	105	101	98	96	93	91	89	1913	800	602
1979 APR 27.0	247	239	231	223	216	208	201	194	188	181	175	169	163	158	153	148	143	138	289	281	271
JD 2443980.5	157	151	145	139	133	128	123	118	114	110	106	102	99	96	94	91	89	4586	975	657	553
1979 APR 17.0	241	233	225	217	210	203	196	189	182	176	170	164	158	153	148	143	138	290	282	273	262
JD 2443970.5	153	147	141	135	130	124	120	115	111	107	103	100	97	94	91	89	87	1311	733	589	523
1979 APR 7.0	235	227	219	211	204	197	190	183	177	171	165	159	154	148	143	139	134	284	274	264	253
JD 2443960.5	149	143	137	131	126	121	116	112	108	104	100	97	94	92	89	87	2129	849	634	551	504
1979 MAR 28.0	229	221	213	206	198	191	184	178	172	165	160	154	149	144	139	134	284	276	266	255	243
(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M14 E07

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

	(FLT T)(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD 2444080.5 1979 JUL 26.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444070.5 1979 JUL 16.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444060.5 1979 JUL 6.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444050.5 1979 JUN 26.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444040.5 1979 JUN 16.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444030.5 1979 JUN 6.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444020.5 1979 MAY 27.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444010.5 1979 MAY 17.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444000.5 1979 MAY 7.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2443990.5 1979 APR 27.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2443980.5 1979 APR 17.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2443970.5 1979 APR 7.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2443960.5 1979 MAR 28.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772

(FLT T)(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

M14
E07

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD 2444080.5	435	469	514	569	643	711	796	892	998	1114	1241	1377	1524	1680	1847	2022	2206	2399	2598	2804	3014
1979 JUL 26.0	799	818	845	877	917	968	1018	1077	1142	1215	1294	1380	1473	1572	1678	1791	1909	2034	2163	2297	2436
JD 2444070.5	452	492	542	603	674	754	845	946	1057	1178	1309	1450	1601	1761	1932	2111	2299	2495	2697	2905	3118
1979 JUL 16.0	805	830	861	898	940	991	1048	1112	1182	1259	1343	1434	1531	1635	1745	1862	1985	2113	2246	2384	2526
JD 2444060.5	473	519	576	726	719	803	898	1003	1119	1244	1380	1526	1681	1846	2020	2204	2395	2594	2799	3010	3224
1979 JUL 6.0	813	843	880	998	964	1019	1081	1149	1224	1306	1394	1489	1591	1700	1815	1936	2063	2195	2332	2473	2618
JD 2444050.5	499	552	630	709	765	854	954	1064	1185	1315	1455	1605	1765	1934	2112	2299	2494	2696	2904	3117	3334
1979 JUN 26.0	823	859	917	944	989	1049	1115	1188	1267	1354	1447	1547	1653	1766	1886	2011	2143	2279	2420	2565	2713
JD 2444040.5	530	597	2122	737	815	909	1014	1129	1254	1386	1533	1688	1852	2026	2208	2399	2597	2802	3012	3228	3446
1979 JUN 16.0	836	885	1935	960	1016	1080	1151	1228	1312	1403	1501	1606	1717	1835	1959	2089	2224	2365	2510	2658	2810
JD 2444030.5	571	785	737	781	867	967	1076	1196	1326	1466	1615	1774	1943	2121	2307	2501	2703	2911	3124	3341	3316
1979 JUN 6.0	855	1026	945	982	1043	1112	1187	1269	1359	1455	1557	1667	1783	1906	2034	2169	2308	2453	2601	2754	2645
JD 2444020.5	652	993	756	830	923	1027	1142	1267	1402	1546	1700	1864	2037	2219	2409	2607	2812	3023	3238	3458	2787
1979 MAY 27.0	908	1102	951	1006	1072	1145	1225	1312	1406	1507	1615	1729	1850	1978	2111	2250	2394	2542	2695	2851	2192
JD 2444010.5	2029	754	798	883	982	1092	1211	1341	1481	1630	1789	1958	2135	2321	2515	2717	2924	3138	3356	3080	2322
1979 MAY 17.0	1973	932	969	1031	1102	1179	1264	1356	1455	1561	1674	1793	1919	2051	2189	2332	2481	2633	2790	2471	1767
JD 2444000.5	854	773	846	939	1044	1159	1284	1419	1563	1718	1881	2054	2236	2426	2624	2829	3040	3257	3477	2553	1984
1979 MAY 7.0	983	934	989	1056	1132	1215	1304	1401	1505	1616	1734	1858	1989	2126	2269	2416	2569	2726	2887	1996	1434
JD 2443990.5	766	814	899	998	1109	1229	1359	1499	1649	1808	1977	2154	2341	2535	2737	2945	3159	3379	2817	2140	1769
1979 APR 27.0	908	947	1010	1083	1163	1251	1345	1447	1556	1672	1795	1925	2060	2202	2349	2502	2659	2820	2249	1598	1213
JD 2443980.5	788	862	955	1061	1176	1302	1438	1583	1738	1902	2076	2258	2449	2647	2853	3064	3282	3100	2330	1869	1652
1979 APR 17.0	907	963	1032	1110	1195	1287	1387	1494	1608	1729	1857	1992	2132	2279	2431	2588	2750	2512	1788	1321	1097
JD 2443970.5	828	915	1015	1126	1247	1378	1519	1670	1830	1999	2178	2364	2560	2762	2972	3187	3408	2557	1994	1717	1609
1979 APR 7.0	916	980	1054	1137	1227	1325	1429	1541	1661	1787	1920	2059	2205	2357	2513	2676	2842	2005	1450	1167	1075
JD 2443960.5	876	970	1076	1193	1320	1457	1603	1759	1925	2099	2283	2474	2674	2881	3094	3314	2814	2149	1798	1652	1622
1979 MAR 28.0	927	998	1077	1165	1260	1362	1472	1589	1714	1845	1983	2128	2279	2435	2597	2764	2243	1601	1250	1120	1132

(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M14 E07

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD 2444080.5	1234	1287	1358	1446	1559	1680	1814	1969	2140	2329	2535	2757	2997	3253	3525	3813	4116	4432	4761	5101	5450
1979 JUL 26.0	2219	2121	2023	1926	1829	1732	1636	1541	1445	1350	1254	1159	1064	968	872	775	678	581	483	385	286
JD 2444070.5	1257	1322	1403	1502	1614	1746	1894	2058	2239	2437	2652	2883	3132	3396	3677	3973	4284	4608	4943	5289	5644
1979 JUL 16.0	2163	2065	1967	1870	1773	1677	1581	1485	1390	1294	1199	1104	1008	912	816	720	623	525	427	329	230
JD 2444060.5	1286	1362	1456	1724	1682	1822	1979	2153	2343	2550	2774	3015	3272	3546	3835	4139	4458	4789	5131	5483	5843
1979 JUL 6.0	2107	2008	1911	1814	1717	1620	1524	1429	1333	1238	1142	1047	951	856	760	663	566	469	371	272	173
JD 2444050.5	1322	1411	1547	1653	1754	1903	2069	2252	2452	2668	2902	3152	3418	3700	3998	4311	4637	4975	5324	5682	6047
1979 JUN 26.0	2049	1951	1853	1756	1659	1563	1467	1371	1276	1180	1085	989	894	798	702	606	509	411	313	215	116
JD 2444040.5	1366	1482	4057	1697	1830	1989	2164	2356	2566	2792	3035	3294	3569	3861	4167	4488	4821	5167	5522	5886	6256
1979 JUN 16.0	1991	1893	1792	1697	1601	1504	1408	1313	1217	1122	1026	931	836	740	644	547	450	353	255	157	58
JD 2444030.5	1426	1810	1682	1763	1911	2079	2264	2466	2685	2920	3173	3441	3726	4026	4341	4670	5011	5363	5725	6095	5960
1979 JUN 6.0	1932	1834	1735	1638	1541	1445	1349	1253	1158	1062	967	872	776	680	584	488	391	294	196	98	3592
JD 2444020.5	1560	2096	1707	1836	1995	2173	2368	2579	2808	3053	3315	3594	3888	4197	4520	4857	5206	5565	5933	6309	4979
1979 MAY 27.0	1872	1772	1675	1578	1481	1385	1289	1193	1098	1002	907	812	716	620	524	428	331	234	136	38	3537
JD 2444010.5	4002	1686	1767	1914	2083	2271	2476	2697	2936	3191	3463	3751	4054	4372	4704	5049	5405	5772	6146	5551	4089
1979 MAY 17.0	1815	1712	1614	1517	1420	1324	1228	1132	1037	941	846	751	655	559	463	367	270	173	75	3574	3477
JD 2444000.5	1837	1707	1835	1996	2176	2373	2588	2820	3069	3334	3615	3913	4225	4552	4893	5246	5609	5983	6364	4549	3418
1979 MAY 7.0	1747	1650	1553	1455	1359	1262	1166	1071	975	880	785	689	594	498	402	306	209	112	18	3514	3415
JD 2443990.5	1673	1761	1909	2081	2272	2479	2704	2947	3205	3481	3772	4079	4401	4737	5086	5447	5818	6199	5066	3737	2982
1979 APR 27.0	1686	1588	1490	1393	1296	1200	1104	1008	913	818	722	627	531	436	340	243	147	51	3549	3452	3353
JD 2443980.5	1695	1825	1987	2170	2371	2589	2825	3077	3346	3631	3933	4249	4581	4926	5283	5652	6032	5612	4119	3190	2750
1979 APR 17.0	1623	1525	1428	1330	1234	1137	1041	946	850	755	660	564	469	373	277	181	85	3579	3487	3389	3290
JD 2443970.5	1744	1895	2069	2263	2474	2702	2948	3211	3490	3786	4097	4424	4765	5119	5485	5863	6250	4563	3443	2884	2684
1979 APR 7.0	1560	1462	1365	1267	1171	1074	978	883	787	692	597	501	406	310	214	118	26	3521	3424	3326	3227
JD 2443960.5	1803	1968	2154	2358	2580	2819	3075	3349	3639	3944	4266	4602	4953	5316	5691	6078	5057	3750	3048	2772	2754
1979 MAR 28.0	1497	1399	1301	1204	1107	1011	915	819	724	629	533	438	343	247	151	57	3554	3459	3361	3263	3164
(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)

JD2443600.5	JD2443640.5	JD2443680.5	JD2443720.5	JD2443760.5
1978 APR 7.0	1978 MAY 12.0	1978 JUN 21.0	1978 JUL 31.0	1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

M14
E08

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2443940.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671792	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.582	DEGREES
MEAN ANOM. AT EPOCH	=	62.528	DEGREES
DATE OF NODAL PASSAGE	=	2444140.137	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2443940.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338620	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.397	DEGREES
ARG. OF PERIHELION	=	286.279	DEGREES
MEAN ANOM. AT EPOCH	=	354.470	DEGREES
DATE OF NODAL PASSAGE	=	2443385.554	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.057	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E08

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)
JD 2444080.5	1217	1292	1368	1327	1063	869	751	686	653	643	649	667	696	736	787	850	928	1022	1137	1281	1461
1979 JUL 26.0	913	961	1010	945	725	550	431	358	322	316	334	370	420	482	555	640	739	854	990	1154	1356
JD 2444070.5	1253	1329	1405	1166	935	789	706	664	648	651	667	695	735	785	849	927	1022	1138	1283	1465	1701
1979 JUL 16.0	944	993	1043	821	619	476	387	340	325	338	370	418	478	550	635	733	849	985	1150	1353	1610
JD 2444060.5	1291	1366	1277	1015	835	731	677	655	653	667	694	733	783	846	924	1020	1137	1283	1468	1706	2024
1979 JUL 6.0	975	1025	923	698	529	421	360	337	343	371	416	475	546	630	729	844	981	1146	1350	1609	1946
JD 2444050.5	1329	1405	1109	891	762	693	663	656	668	693	730	780	844	922	1018	1135	1283	1468	1709	2099	0
1979 JUN 26.0	1007	1059	787	590	459	384	351	350	373	416	473	543	627	724	840	976	1142	1347	1607	1995	0
JD 2444040.5	1368	1214	960	799	713	672	660	668	692	728	777	840	918	1014	1133	1281	1468	1710	2037	0	0
1979 JUN 16.0	1040	885	660	504	411	367	358	377	417	472	541	624	721	836	973	1139	1344	1604	1949	0	0
JD 2444030.5	1323	1042	846	737	684	665	670	691	726	774	837	914	1011	1130	1278	1466	1710	2036	0	0	0
1979 JUN 6.0	984	741	555	443	385	369	383	419	472	540	622	719	834	970	1136	1341	1602	1947	0	0	0
JD 2444020.5	1137	903	766	699	672	672	690	724	771	833	911	1007	1126	1274	1463	1708	2036	0	0	0	0
1979 MAY 27.0	830	615	479	407	381	389	422	473	540	621	717	832	968	1134	1339	1601	1945	0	0	0	0
JD 2444010.5	972	803	718	681	675	691	722	769	830	907	1003	1122	1271	1460	1706	2035	0	0	0	0	0
1979 MAY 17.0	684	521	431	395	397	426	476	541	621	717	831	967	1133	1338	1600	1945	0	0	0	0	0
JD 2444000.5	849	741	693	681	692	722	767	827	904	999	1119	1267	1457	1703	2033	0	0	0	0	0	0
1979 MAY 7.0	569	459	411	406	432	479	543	622	718	831	967	1133	1338	1599	1945	0	0	0	0	0	0
JD 2443990.5	770	708	688	695	722	765	825	901	996	1115	1264	1454	1700	2031	0	0	0	0	0	0	0
1979 APR 27.0	492	430	417	438	483	546	624	719	832	968	1133	1339	1600	1946	0	0	0	0	0	0	0
JD 2443980.5	727	698	700	724	765	823	899	994	1112	1261	1451	1698	2029	0	0	0	0	0	0	0	0
1979 APR 17.0	451	429	446	488	549	627	722	835	970	1135	1340	1602	1948	0	0	0	0	0	0	0	0
JD 2443970.5	710	706	727	766	823	897	992	1110	1259	1449	1696	2027	0	0	0	0	0	0	0	0	0
1979 APR 7.0	443	454	493	553	631	725	838	973	1138	1343	1605	1951	0	0	0	0	0	0	0	0	0
JD 2443960.5	715	732	769	824	897	991	1109	1258	1447	1695	2027	0	0	0	0	0	0	0	0	0	0
1979 MAR 28.0	463	500	558	635	729	842	977	1142	1347	1609	1955	0	0	0	0	0	0	0	0	0	0
(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)

JD2443800.5 1978 OCT 19.0 | JD2443840.5 1978 NOV 28.0 | JD2443880.5 1979 JAN 7.0 | JD2443920.5 1979 FEB 16.0 | JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E08

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)
JD 2444080.5	32	45	59	87	69	73	96	130	167	195	209	211	207	199	191	183	175	167	160	153	148
1979 JUL 26.0	81	107	135	208	180	206	281	397	542	698	845	968	1066	1143	1205	1255	1297	1334	1366	1395	1423
JD 2444070.5	17	31	44	58	53	71	105	145	181	203	213	214	210	204	197	190	183	176	170	162	153
1979 JUL 16.0	47	74	102	139	144	203	306	443	596	745	874	979	1062	1128	1182	1227	1265	1298	1328	1356	1382
JD 2444060.5	2	16	49	36	47	78	120	161	192	210	216	216	213	208	203	197	191	185	178	167	184
1979 JUL 6.0	13	40	106	89	130	221	348	497	646	780	890	978	1049	1106	1154	1194	1229	1260	1289	1315	1349
JD 2444050.5	-12	1	21	24	51	92	138	176	201	214	219	219	217	213	209	204	199	193	184	91	0
1979 JUN 26.0	3579	7	41	63	140	258	400	549	686	801	894	968	1029	1079	1121	1158	1191	1220	1247	1218	0
JD 2444040.5	-27	9	3	24	64	112	156	189	208	218	222	222	221	218	214	210	205	198	177	0	0
1979 JUN 16.0	3546	2	1	63	171	308	454	593	711	808	886	950	1003	1047	1085	1119	1150	1177	1199	0	0
JD 2444030.5	0	-14	-0	35	83	132	171	197	212	220	223	224	224	222	219	215	210	198	0	0	0
1979 JUN 6.0	3570	3547	3590	87	218	363	502	623	723	804	870	925	971	1011	1046	1077	1106	1131	0	0	0
JD 2444020.5	-29	-24	6	54	106	150	182	202	214	221	225	226	226	225	223	219	211	0	0	0	0
1979 MAY 27.0	3500	3522	7	132	273	412	535	638	722	790	847	894	935	971	1004	1033	1060	0	0	0	0
JD 2444010.5	-45	-20	24	77	126	163	189	205	215	221	225	227	227	227	225	220	0	0	0	0	0
1979 MAY 17.0	3460	3530	47	186	325	450	554	640	710	768	817	859	896	929	959	987	0	0	0	0	0
JD 2444000.5	-46	-5	48	100	142	171	192	205	214	220	224	226	227	227	224	0	0	0	0	0	0
1979 MAY 7.0	3456	3565	101	240	366	472	560	631	690	740	783	820	854	884	913	0	0	0	0	0	0
JD 2443990.5	-34	17	71	117	151	175	192	203	211	217	221	224	225	225	0	0	0	0	0	0	0
1979 APR 27.0	3484	18	157	285	392	481	553	613	663	707	745	778	809	838	0	0	0	0	0	0	0
JD 2443980.5	-12	42	90	128	156	175	189	200	207	213	217	220	222	0	0	0	0	0	0	0	0
1979 APR 17.0	3535	75	204	314	403	476	537	588	631	669	703	734	763	0	0	0	0	0	0	0	0
JD 2443970.5	11	62	103	134	156	172	185	194	202	208	212	215	0	0	0	0	0	0	0	0	0
1979 APR 7.0	3594	125	237	327	402	462	514	557	595	629	660	688	0	0	0	0	0	0	0	0	0
JD 2443960.5	33	76	109	134	153	167	178	187	194	200	205	0	0	0	0	0	0	0	0	0	0
1979 MAR 28.0	47	161	253	328	390	441	485	523	556	587	615	0	0	0	0	0	0	0	0	0	0
(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)

JD2443800.5 1978 OCT 19.0 | JD2443840.5 1978 NOV 28.0 | JD2443880.5 1979 JAN 7.0 | JD2443920.5 1979 FEB 16.0 | JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

M1
E08

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)
JD 2444080.5	-38	-12	14	-231	-230	-225	-215	-201	-182	-159	-133	-105	-75	-44	-12	19	50	81	109	134	156
1979 JUL 26.0	3508	3569	30	2826	2841	2886	2954	3032	3112	3192	3271	3349	3425	3500	3575	49	122	196	271	346	421
JD 2444070.5	-46	-20	5	-231	-229	-224	-214	-200	-181	-159	-133	-105	-76	-45	-13	18	50	80	109	136	164
1979 JUL 16.0	3490	3551	12	2772	2805	2866	2942	3023	3105	3185	3264	3342	3418	3493	3567	41	114	188	262	336	408
JD 2444060.5	-55	-29	-230	-229	-228	-222	-213	-199	-180	-159	-134	-106	-77	-46	-14	17	49	80	110	143	13
1979 JUL 6.0	3472	3533	2710	2728	2780	2852	2932	3015	3097	3178	3257	3334	3410	3485	3559	33	106	179	252	323	406
JD 2444050.5	-64	-38	-226	-226	-225	-221	-212	-198	-180	-159	-134	-107	-78	-47	-15	16	48	80	114	281	
1979 JUN 26.0	3453	3514	2656	2696	2762	2841	2923	3007	3089	3169	3248	3326	3402	3477	3551	24	97	169	240	302	
JD 2444040.5	-73	-220	-220	-223	-223	-219	-211	-198	-181	-160	-136	-109	-80	-49	-17	14	47	82	133	0	0
1979 JUN 16.0	3434	2591	2615	2673	2749	2831	2915	2998	3080	3160	3239	3317	3393	3468	3542	15	87	158	223	0	0
JD 2444030.5	-212	-211	-215	-220	-221	-218	-210	-198	-181	-161	-137	-111	-82	-51	-19	13	47	89	0	0	
1979 JUN 6.0	2530	2541	2588	2658	2739	2822	2905	2988	3070	3151	3230	3308	3384	3459	3532	5	76	144	0	0	0
JD 2444020.5	-200	-204	-211	-217	-220	-217	-210	-198	-183	-163	-139	-113	-84	-53	-21	12	50	0	0	0	
1979 MAY 27.0	2472	2506	2569	2647	2729	2812	2895	2978	3060	3141	3220	3298	3374	3449	3523	3595	64	0	0	0	
JD 2444010.5	-189	-198	-208	-216	-219	-217	-211	-200	-184	-165	-142	-116	-87	-56	-23	12	0	0	0	0	0
1979 MAY 17.0	2429	2483	2556	2636	2718	2801	2884	2967	3049	3130	3209	3287	3364	3439	3512	3583	0	0	0	0	0
JD 2444000.5	-181	-195	-206	-215	-218	-217	-211	-201	-186	-167	-144	-118	-90	-58	-24	0	0	0	0	0	
1979 MAY 7.0	2401	2468	2545	2625	2707	2789	2872	2955	3037	3118	3198	3277	3353	3428	3501	0	0	0	0	0	0
JD 2443990.5	-176	-192	-205	-214	-218	-218	-213	-203	-188	-170	-147	-121	-93	-60	0	0	0	0	0	0	
1979 APR 27.0	2382	2456	2533	2613	2694	2776	2859	2942	3025	3107	3187	3266	3343	3417	0	0	0	0	0	0	
JD 2443980.5	-173	-190	-204	-213	-218	-219	-214	-205	-191	-173	-151	-125	-95	0	0	0	0	0	0	0	0
1979 APR 17.0	2369	2443	2520	2600	2680	2762	2846	2929	3012	3095	3175	3255	3332	0	0	0	0	0	0	0	0
JD 2443970.5	-171	-189	-203	-213	-219	-220	-216	-207	-194	-176	-154	-128	0	0	0	0	0	0	0	0	
1979 APR 7.0	2356	2430	2506	2585	2665	2748	2831	2916	2999	3082	3164	3243	0	0	0	0	0	0	0	0	0
JD 2443960.5	-170	-188	-202	-213	-219	-221	-217	-209	-196	-179	-157	0	0	0	0	0	0	0	0	0	
1979 MAR 28.0	2342	2415	2491	2569	2650	2733	2817	2902	2986	3070	3152	0	0	0	0	0	0	0	0	0	

(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)

JD2443800.5 1978 OCT 19.0 | JD2443840.5 1978 NOV 28.0 | JD2443880.5 1979 JAN 7.0 | JD2443920.5 1979 FEB 16.0 | JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE — EARTH - MARS TRAJECTORY PARAMETERS — M14 E08

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

	(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)
JD 2444080.5 1979 JUL 26.0		2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080
JD 2444070.5 1979 JUL 16.0		2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115
JD 2444060.5 1979 JUL 6.0		2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146
JD 2444050.5 1979 JUN 26.0		2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	0
JD 2444040.5 1979 JUN 16.0		2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	0	0
JD 2444030.5 1979 JUN 6.0		2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	0	0	0
JD 2444020.5 1979 MAY 27.0		2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	0	0	0	0
JD 2444010.5 1979 MAY 17.0		2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	0	0	0	0	0
JD 2444000.5 1979 MAY 7.0		2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	0	0	0	0	0
JD 2443990.5 1979 APR 27.0		2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	0	0	0	0	0
JD 2443980.5 1979 APR 17.0		2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	0	0	0	0	0
JD 2443970.5 1979 APR 7.0		2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	0	0	0	0	0
JD 2443960.5 1979 MAR 28.0		2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	0	0	0	0	0

(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)

JD2443800.5 1978 OCT 19.0 — JD2443840.5 1978 NOV 28.0 — JD2443880.5 1979 JAN 7.0 — JD2443920.5 1979 FEB 16.0 — JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E08

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)
JD 2444080.5	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270
1979 JUL 26.0	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416
JD 2444070.5	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257
1979 JUL 16.0	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389
JD 2444060.5	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244
1979 JUL 6.0	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363
JD 2444050.5	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	0
1979 JUN 26.0	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	0
JD 2444040.5	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217	0	0
1979 JUN 16.0	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	0	0
JD 2444030.5	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	0	0	0
1979 JUN 6.0	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	0	0	0
JD 2444020.5	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	0	0	0	0
1979 MAY 27.0	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	0	0	0	0
JD 2444010.5	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	0	0	0	0	0
1979 MAY 17.0	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	0	0	0	0	0
JD 2444000.5	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	0	0	0	0	0	0
1979 MAY 7.0	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	0	0	0	0	0	0
JD 2443990.5	148	148	148	148	148	148	148	148	148	148	148	148	148	148	0	0	0	0	0	0	0
1979 APR 27.0	207	207	207	207	207	207	207	207	207	207	207	207	207	207	0	0	0	0	0	0	0
JD 2443980.5	134	134	134	134	134	134	134	134	134	134	134	134	134	0	0	0	0	0	0	0	0
1979 APR 17.0	187	187	187	187	187	187	187	187	187	187	187	187	187	0	0	0	0	0	0	0	0
JD 2443970.5	120	120	120	120	120	120	120	120	120	120	120	120	0	0	0	0	0	0	0	0	0
1979 APR 7.0	167	167	167	167	167	167	167	167	167	167	167	167	0	0	0	0	0	0	0	0	0
JD 2443960.5	105	105	105	105	105	105	105	105	105	105	105	0	0	0	0	0	0	0	0	0	0
1979 MAR 28.0	146	146	146	146	146	146	146	146	146	146	146	0	0	0	0	0	0	0	0	0	0

(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)
JD 2443800.5																					
1978 OCT 19.0																					
JD 2443840.5																					
1978 NOV 28.0																					
JD 2443880.5																					
1979 JAN 7.0																					
JD 2443920.5																					
1979 FEB 16.0																					
JD 2443960.5																					
1979 MAR 28.0																					

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E08

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

	(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)
JD 2444080.5		286	186	86	3585	3484	3383	3281	3179	3077	2975	2874	2772	2671	2570	2470	2370	2271	2172	2074	1977	1880
1979 JUL 26.0		1621	1683	1746	-1771	-1603	-1491	-1420	-1371	-1330	-1293	-1258	-1222	-1186	-1150	-1113	-1074	-1036	-996	-956	-915	-874
JD 2444070.5		230	130	30	3530	3429	3327	3225	3124	3022	2920	2818	2717	2615	2515	2414	2315	2215	2117	2019	1921	1824
1979 JUL 16.0		1656	1718	1781	-1672	-1538	-1454	-1398	-1356	-1318	-1282	-1247	-1211	-1174	-1137	-1098	-1060	-1020	-979	-939	-897	-854
JD 2444060.5		173	74	3574	3473	3372	3271	3169	3067	2965	2863	2762	2660	2559	2458	2358	2258	2159	2060	1962	1865	1767
1979 JUL 6.0		1692	1754	-1749	-1591	-1490	-1427	-1382	-1343	-1307	-1271	-1235	-1198	-1161	-1122	-1083	-1043	-1003	-961	-920	-877	-834
JD 2444050.5		116	17	3516	3416	3314	3213	3111	3010	2908	2806	2704	2603	2501	2401	2300	2201	2101	2003	1905	1808	0
1979 JUN 26.0		1728	1789	-1652	-1530	-1457	-1407	-1368	-1331	-1295	-1259	-1222	-1184	-1146	-1106	-1066	-1025	-984	-942	-899	-857	0
JD 2444040.5		58	3558	3458	3357	3256	3155	3053	2951	2849	2747	2646	2544	2443	2342	2242	2142	2043	1944	1846	0	0
1979 JUN 16.0		1764	-1720	-1575	-1489	-1434	-1392	-1355	-1319	-1282	-1245	-1207	-1169	-1129	-1089	-1048	-1006	-964	-921	-878	0	0
JD 2444030.5		3592	3498	3398	3298	3197	3095	2994	2892	2790	2688	2586	2485	2384	2283	2183	2083	1984	1885	0	0	0
1979 JUN 6.0		-1784	-1628	-1523	-1460	-1416	-1378	-1342	-1306	-1268	-1230	-1191	-1152	-1111	-1070	-1028	-986	-943	-899	0	0	0
JD 2444020.5		3537	3438	3338	3238	3137	3035	2934	2832	2730	2628	2526	2425	2324	2223	2123	2023	1924	0	0	0	0
1979 MAY 27.0		-1687	-1561	-1488	-1440	-1401	-1365	-1328	-1291	-1253	-1214	-1174	-1133	-1092	-1050	-1007	-964	-920	0	0	0	0
JD 2444010.5		3477	3377	3277	3177	3076	2974	2873	2771	2669	2567	2465	2364	2263	2162	2062	1962	0	0	0	0	0
1979 MAY 17.0		-1604	-1517	-1465	-1424	-1387	-1351	-1314	-1275	-1236	-1196	-1155	-1114	-1071	-1028	-985	-941	0	0	0	0	0
JD 2444000.5		3415	3316	3216	3115	3014	2913	2811	2709	2607	2505	2404	2302	2201	2100	2000	0	0	0	0	0	0
1979 MAY 7.0		-1549	-1489	-1447	-1409	-1373	-1336	-1297	-1258	-1218	-1177	-1135	-1092	-1049	-1006	-962	0	0	0	0	0	0
JD 2443990.5		3353	3254	3153	3053	2952	2850	2749	2647	2545	2443	2342	2240	2139	2038	0	0	0	0	0	0	0
1979 APR 27.0		-1515	-1469	-1431	-1395	-1357	-1319	-1280	-1239	-1198	-1156	-1113	-1070	-1026	-982	0	0	0	0	0	0	0
JD 2443980.5		3290	3191	3091	2990	2889	2788	2686	2584	2482	2381	2279	2177	2076	0	0	0	0	0	0	0	0
1979 APR 17.0		-1492	-1453	-1416	-1379	-1340	-1301	-1261	-1219	-1177	-1134	-1091	-1047	-1002	0	0	0	0	0	0	0	0
JD 2443970.5		3227	3128	3028	2927	2826	2725	2623	2521	2419	2318	2216	2115	0	0	0	0	0	0	0	0	0
1979 APR 7.0		-1474	-1437	-1400	-1361	-1322	-1282	-1240	-1198	-1155	-1111	-1067	-1022	0	0	0	0	0	0	0	0	0
JD 2443960.5		3164	3064	2964	2864	2763	2661	2560	2458	2356	2254	2153	0	0	0	0	0	0	0	0	0	0
1979 MAR 28.0		-1457	-1420	-1382	-1343	-1302	-1261	-1219	-1176	-1132	-1087	-1043	0	0	0	0	0	0	0	0	0	0
	(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)

JD2443800.5	JD2443840.5	JD2443880.5	JD2443920.5	JD2443960.5
1978 OCT 19.0	1978 NOV 28.0	1979 JAN 7.0	1979 FEB 16.0	1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E08

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

	(FLT T)(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)
JD 2444080.5	30	45	96	551	71	39	27	21	18	16	15	14	14	15	15	17	19	24	31	47	103
1979 JUL 26.0	956	980	996	998	921	805	714	655	621	604	600	609	628	658	701	758	834	933	1066	1247	1502
JD 2444070.5	9	16	70	30	12	8	6	5	4	4	4	4	4	4	4	5	6	7	10	18	88
1979 JUL 16.0	970	990	999	966	854	750	679	637	614	607	613	629	657	697	751	823	918	1044	1217	1458	1814
JD 2444060.5	73	170	476	100	56	40	32	27	24	23	22	22	23	24	26	31	37	50	78	195	385
1979 JUL 6.0	982	997	995	904	789	706	655	627	616	618	631	657	694	745	813	904	1024	1188	1417	1753	2274
JD 2444050.5	200	1384	275	127	84	64	53	47	43	41	40	41	43	46	52	62	80	116	221	2994	0
1979 JUN 26.0	992	1000	950	834	737	675	641	625	624	634	657	691	740	804	890	1005	1161	1378	1695	2182	0
JD 2444040.5	581	790	237	142	103	83	72	64	60	59	59	61	65	72	84	104	142	234	722	0	0
1979 JUN 16.0	998	985	881	772	699	656	635	631	639	658	690	735	797	879	988	1136	1341	1640	2098	0	0
JD 2444030.5	7676	432	221	151	118	99	87	81	77	76	78	82	89	102	123	161	242	515	0	0	0
1979 JUN 6.0	999	928	811	725	674	648	639	644	661	690	732	790	868	972	1112	1307	1588	2018	0	0	0
JD 2444020.5	860	335	212	158	129	112	102	96	94	94	98	105	118	139	175	246	436	0	0	0	0
1979 MAY 27.0	968	854	755	694	661	648	650	664	691	730	785	859	958	1091	1275	1541	1943	0	0	0	0
JD 2444010.5	515	290	206	163	139	124	115	111	110	113	120	132	152	186	249	394	0	0	0	0	0
1979 MAY 17.0	899	789	717	677	659	657	669	693	730	781	851	945	1071	1246	1496	1873	0	0	0	0	0
JD 2444000.5	395	263	201	167	147	134	128	125	127	133	144	163	194	250	366	0	0	0	0	0	0
1979 MAY 7.0	827	743	695	672	666	675	696	730	779	845	934	1054	1220	1456	1809	0	0	0	0	0	0
JD 2443990.5	333	245	198	171	156	144	140	140	144	154	172	200	250	345	0	0	0	0	0	0	0
1979 APR 27.0	772	715	686	676	682	700	732	777	840	925	1039	1196	1418	1749	0	0	0	0	0	0	0
JD 2443980.5	295	232	195	173	160	153	152	155	163	179	204	248	327	0	0	0	0	0	0	0	0
1979 APR 17.0	737	702	688	690	706	735	776	837	917	1026	1174	1384	1694	0	0	0	0	0	0	0	0
JD 2443970.5	268	221	193	176	166	163	164	171	184	207	245	311	0	0	0	0	0	0	0	0	0
1979 APR 7.0	720	701	700	713	739	779	835	911	1014	1155	1353	1643	0	0	0	0	0	0	0	0	0
JD 2443960.5	248	213	191	178	172	172	176	188	207	240	297	0	0	0	0	0	0	0	0	0	0
1979 MAR 28.0	716	711	721	744	782	834	907	1004	1138	1325	1597	0	0	0	0	0	0	0	0	0	0

(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)

JD2443800.5 1978 OCT 19.0

JD2443840.5 1978 NOV 28.0

JD2443880.5 1979 JAN 7.0

JD2443920.5 1979 FEB 16.0

JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E08

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

	(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)
JD 2444080.5	-45	-19	-3	1	68	168	250	309	350	378	399	413	424	430	435	437	437	436	434	432	430	
1979 JUL 26.0	2035	2014	1988	1729	1648	1558	1502	1482	-1492	-1529	-1596	-1699	-1853	-2088	-2471	-3174	-4821	-9999	-9999	-9999	-9999	
JD 2444070.5	-30	-9	-0	29	124	215	281	327	359	381	397	408	415	420	422	422	420	418	415	412	409	
1979 JUL 16.0	2005	1981	1952	1669	1575	1504	1473	-1473	-1502	-1560	-1653	-1792	-2005	-2348	-2966	-4343	-9831	-9999	-9999	-9999	-9999	
JD 2444060.5	-17	-2	5	81	178	252	304	339	364	381	393	400	405	407	407	405	402	398	394	390	388	
1979 JUL 6.0	1974	1947	1681	1595	1512	1467	-1457	-1478	-1528	-1611	-1737	-1930	-2238	-2782	-3948	-8004	-9999	-9999	-9999	-9999	-9999	
JD 2444050.5	-7	0	41	138	222	280	319	346	365	378	386	391	393	393	391	387	383	377	372	367	0	
1979 JUN 26.0	1941	1911	1615	1524	1465	1445	-1457	-1499	-1573	-1687	-1862	-2140	-2623	-3620	-6740	-9999	-9999	-9999	-9999	-9999	0	
JD 2444040.5	-1	12	98	189	255	299	329	349	362	371	376	379	379	376	373	368	362	355	349	0	0	
1979 JUN 16.0	1907	1630	1540	1468	1437	-1439	-1473	-1538	-1642	-1801	-2053	-2483	-3346	-5822	-9999	-9999	-9999	-9999	-9999	0	0	
JD 2444030.5	0	59	154	228	277	310	333	347	357	363	365	365	363	359	353	346	339	331	0	0	0	
1979 JUN 6.0	1633	1559	1476	1431	-1425	-1451	-1508	-1601	-1746	-1975	-2361	-3115	-5132	-9999	-9999	-9999	-9999	-9999	0	0	0	
JD 2444020.5	26	117	199	255	292	316	332	343	349	352	352	349	345	339	332	323	315	0	0	0	0	
1979 MAY 27.0	1576	1488	1430	-1413	-1432	-1481	-1565	-1698	-1906	-2255	-2920	-4599	-9999	-9999	-9999	-9999	-9999	0	0	0	0	
JD 2444010.5	80	169	232	273	300	317	328	335	338	338	336	332	326	318	309	299	0	0	0	0	0	
1979 MAY 17.0	1504	1434	1407	-1416	-1457	-1534	-1655	-1846	-2162	-2755	-4180	-9999	-9999	-9999	-9999	-9999	0	0	0	0	0	
JD 2444000.5	136	207	253	283	302	314	321	325	325	323	319	312	304	294	284	0	0	0	0	0	0	
1979 MAY 7.0	1441	1403	-1403	-1437	-1506	-1617	-1792	-2082	-2614	-3844	-9347	-9999	-9999	-9999	-9999	0	0	0	0	0	0	
JD 2443990.5	180	232	265	286	300	308	312	312	310	306	300	291	281	269	0	0	0	0	0	0	0	
1979 APR 27.0	1402	-1393	-1420	-1481	-1583	-1745	-2012	-2494	-3573	-7827	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	
JD 2443980.5	210	247	270	285	294	298	300	298	293	287	278	268	255	0	0	0	0	0	0	0	0	
1979 APR 17.0	-1387	-1406	-1460	-1554	-1705	-1951	-2392	-3351	-6708	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	
JD 2443970.5	228	254	270	280	285	287	285	281	274	266	255	242	0	0	0	0	0	0	0	0	0	
1979 APR 7.0	-1395	-1443	-1529	-1669	-1898	-2304	-3167	-6037	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	
JD 2443960.5	237	255	266	272	274	272	268	262	253	242	229	0	0	0	0	0	0	0	0	0	0	
1979 MAR 28.0	-1428	-1508	-1638	-1853	-2230	-3015	-5477	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	
	(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)

JD2443800.5 1978 OCT 19.0 | JD2443840.5 1978 NOV 28.0 | JD2443880.5 1979 JAN 7.0 | JD2443920.5 1979 FEB 16.0 | JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E08

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

	(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)
JD 2444080.5	97	95	93	6899	978	623	508	451	415	388	365	345	326	309	291	274	257	240	222	204	184
1979 JUL 26.0	162	157	153	305	298	290	280	269	258	247	236	224	213	201	189	177	165	153	140	127	114
JD 2444070.5	95	93	92	1501	724	550	476	433	403	378	357	338	320	302	285	268	250	232	214	194	172
1979 JUL 16.0	158	153	149	300	292	282	272	261	250	239	227	216	204	192	180	168	156	143	130	117	103
JD 2444060.5	94	92	3809	899	606	506	453	419	392	370	350	331	314	296	279	261	243	224	204	183	159
1979 JUL 6.0	154	149	301	294	285	275	264	253	242	230	219	207	195	183	171	158	146	133	119	105	91
JD 2444050.5	92	91	1260	688	542	476	436	407	383	362	343	325	307	289	272	253	234	214	193	170	0
1979 JUN 26.0	150	146	296	287	277	267	256	245	233	221	210	198	186	173	161	148	135	122	108	94	0
JD 2444040.5	91	2343	818	589	502	455	423	397	375	355	337	318	301	283	264	245	225	204	180	0	0
1979 JUN 16.0	146	297	289	280	270	259	247	236	224	212	200	188	176	163	151	138	124	110	96	0	0
JD 2444030.5	9999	1056	653	534	476	439	411	388	368	348	330	312	294	275	256	236	215	191	0	0	0
1979 JUN 6.0	298	291	282	272	261	250	239	227	215	203	191	179	166	153	140	127	113	98	0	0	0
JD 2444020.5	1601	748	573	500	457	427	402	380	361	342	324	305	287	268	248	226	203	0	0	0	0
1979 MAY 27.0	293	284	274	264	253	241	229	218	206	194	181	169	156	143	129	115	101	0	0	0	0
JD 2444010.5	904	624	527	477	443	416	394	373	354	335	317	299	280	260	238	215	0	0	0	0	0
1979 MAY 17.0	286	277	266	255	244	232	220	208	196	184	171	158	145	131	117	103	0	0	0	0	0
JD 2444000.5	694	560	498	460	431	407	386	367	348	329	311	292	272	251	227	0	0	0	0	0	0
1979 MAY 7.0	279	268	257	246	234	223	211	198	186	173	161	147	134	120	105	0	0	0	0	0	0
JD 2443990.5	602	523	479	447	422	400	380	360	342	323	304	284	263	240	0	0	0	0	0	0	0
1979 APR 27.0	271	260	248	237	225	213	201	188	176	163	150	136	122	107	0	0	0	0	0	0	0
JD 2443980.5	553	500	464	437	414	393	374	355	336	317	297	277	254	0	0	0	0	0	0	0	0
1979 APR 17.0	262	251	239	227	215	203	191	178	165	152	138	124	110	0	0	0	0	0	0	0	0
JD 2443970.5	523	483	453	429	407	387	368	349	330	311	290	268	0	0	0	0	0	0	0	0	0
1979 APR 7.0	253	241	230	218	206	193	180	167	154	141	126	112	0	0	0	0	0	0	0	0	0
JD 2443960.5	504	471	445	422	402	382	363	344	325	305	283	0	0	0	0	0	0	0	0	0	0
1979 MAR 28.0	243	232	220	208	195	182	170	156	143	129	114	0	0	0	0	0	0	0	0	0	0
	(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)

JD2443800.5
1978 OCT 16.0

JD2443840.5
1978 NOV 28.0

JD2443880.5
1979 JAN 7.0

JD2443920.5
1979 FEB 16.0

JD2443960.5
1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M14 E08

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)
JD 2444080.5 1979 JUL 26.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444070.5 1979 JUL 16.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444060.5 1979 JUL 6.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444050.5 1979 JUN 26.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0
JD 2444040.5 1979 JUN 16.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0
JD 2444030.5 1979 JUN 6.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0
JD 2444020.5 1979 MAY 27.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0
JD 2444010.5 1979 MAY 17.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0
JD 2444000.5 1979 MAY 7.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0
JD 2443990.5 1979 APR 27.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0
JD 2443980.5 1979 APR 17.0	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0
JD 2443970.5 1979 APR 7.0	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0
JD 2443960.5 1979 MAR 28.0	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0

(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)

JD2443800.5 1978 OCT 19.0 JD2443840.5 1978 NOV 28.0 JD2443880.5 1979 JAN 7.0 JD2443920.5 1979 FEB 16.0 JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

M14
E08

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)
JD 2444080.5	3014	3229	3445	3328	2577	2038	1718	1544	1460	1433	1447	1495	1572	1678	1815	1986	2199	2462	2787	3196	3715
1979 JUL 26.0	2436	2578	2722	2531	1887	1378	1040	839	741	724	773	872	1011	1185	1394	1638	1925	2262	2662	3146	3742
JD 2444070.5	3118	3334	3552	2868	2220	1819	1598	1488	1447	1453	1495	1569	1674	1810	1982	2196	2461	2789	3202	3726	4411
1979 JUL 16.0	2526	2671	2818	2166	1576	1168	919	788	749	782	871	1003	1174	1380	1624	1910	2247	2648	3134	3733	4496
JD 2444060.5	3224	3442	3187	2443	1944	1665	1522	1463	1459	1496	1566	1668	1804	1975	2190	2456	2787	3203	3733	4426	5355
1979 JUL 6.0	2618	2766	2465	1806	1318	1012	844	780	796	873	999	1165	1369	1610	1896	2233	2635	3122	3724	4492	5494
JD 2444050.5	3334	3553	2706	2099	1746	1564	1484	1467	1496	1562	1662	1796	1967	2182	2449	2782	3201	3735	4435	5573	0
1979 JUN 26.0	2713	2864	2068	1493	1120	909	817	815	860	998	1159	1360	1600	1884	2221	2622	3111	3715	4486	5637	0
JD 2444040.5	3446	3004	2289	1847	1615	1508	1477	1498	1559	1656	1788	1958	2173	2441	2775	3196	3733	4437	5392	0	0
1979 JUN 16.0	2810	2352	1697	1247	985	861	838	891	1001	1157	1354	1592	1874	2210	2613	3101	3706	4479	5503	0	0
JD 2444030.5	3316	2519	1973	1679	1539	1491	1502	1557	1650	1779	1949	2163	2430	2766	3188	3728	4436	5391	0	0	0
1979 JUN 6.0	2645	1931	1394	1073	913	867	905	1006	1157	1350	1586	1868	2203	2604	3093	3699	4473	5495	0	0	0
JD 2444020.5	2787	2130	1759	1579	1509	1508	1556	1644	1772	1939	2152	2420	2755	3177	3721	4431	5390	0	0	0	0
1979 MAY 27.0	2192	1566	1175	972	901	924	1015	1160	1350	1584	1863	2197	2599	3086	3693	4468	5491	0	0	0	0
JD 2444010.5	2322	1858	1628	1532	1517	1557	1641	1764	1930	2142	2409	2745	3168	3712	4424	5386	0	0	0	0	0
1979 MAY 17.0	1767	1295	1041	940	945	1027	1166	1353	1584	1862	2195	2596	3083	3690	4464	5489	0	0	0	0	0
JD 2444000.5	1984	1690	1563	1531	1561	1639	1759	1922	2133	2399	2734	3158	3703	4417	5381	0	0	0	0	0	0
1979 MAY 7.0	1434	1120	985	971	1043	1175	1358	1587	1864	2196	2596	3082	3689	4464	5489	0	0	0	0	0	0
JD 2443990.5	1769	1602	1550	1569	1640	1756	1916	2125	2390	2724	3148	3694	4409	5375	0	0	0	0	0	0	0
1979 APR 27.0	1213	1037	1001	1060	1187	1366	1593	1868	2199	2599	3085	3691	4466	5491	0	0	0	0	0	0	0
JD 2443980.5	1652	1575	1581	1644	1755	1912	2119	2383	2716	3140	3686	4401	5369	0	0	0	0	0	0	0	0
1979 APR 17.0	1097	1036	1081	1201	1376	1601	1875	2206	2605	3091	3697	4472	5497	0	0	0	0	0	0	0	0
JD 2443970.5	1609	1598	1652	1758	1911	2115	2378	2711	3134	3679	4396	5365	0	0	0	0	0	0	0	0	0
1979 APR 7.0	1075	1105	1217	1388	1611	1885	2215	2613	3100	3706	4481	5507	0	0	0	0	0	0	0	0	0
JD 2443960.5	1622	1665	1764	1913	2115	2375	2707	3130	3675	4392	5362	0	0	0	0	0	0	0	0	0	0
1979 MAR 28.0	1132	1235	1402	1623	1896	2226	2625	3111	3718	4493	5519	0	0	0	0	0	0	0	0	0	0
(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)

JD2443800.5 1978 OCT 19.0 | JD2443840.5 1978 NOV 28.0 | JD2443880.5 1979 JAN 7.0 | JD2443920.5 1979 FEB 16.0 | JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E08

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

	(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)
JD 2444080.5	5450	5806	6168	5860	4463	3415	2758	2383	2200	2157	2220	2366	2582	2863	3208	3624	4124	4724	5449	6341	7457	
1979 JUL 26.0	286	186	86	3585	3484	3383	3281	3179	3077	2975	2874	2772	2671	2570	2470	2370	2271	2172	2074	1977	1880	
JD 2444070.5	5644	6005	6370	5034	3797	2987	2517	2276	2196	2235	2366	2572	2847	3190	3605	4105	4707	5437	6336	7459	8907	
1979 JUL 16.0	230	130	30	3530	3429	3327	3225	3124	3022	2920	2818	2717	2615	2515	2414	2315	2215	2117	2019	1921	1824	
JD 2444060.5	5843	6208	5652	4249	3262	2676	2366	2243	2255	2369	2565	2833	3172	3586	4086	4689	5422	6326	7458	8918	9999	
1979 JUL 6.0	173	74	3574	3473	3372	3271	3169	3067	2965	2863	2762	2660	2559	2458	2358	2258	2159	2060	1962	1865	1767	
JD 2444050.5	6047	6417	4774	3591	2866	2473	2301	2282	2377	2561	2821	3156	3567	4066	4670	5404	6312	7451	8920	9999	0	
1979 JUN 26.0	116	17	3516	3416	3314	3213	3111	3010	2908	2806	2704	2603	2501	2401	2300	2201	2101	2003	1905	1808	0	
JD 2444040.5	6256	5356	3985	3094	2601	2370	2316	2389	2560	2812	3142	3550	4047	4651	5388	6296	7440	8916	9999	0	0	
1979 JUN 16.0	58	3558	3458	3357	3256	3155	3053	2951	2849	2747	2646	2544	2443	2342	2242	2142	2043	1944	1846	0	0	
JD 2444030.5	5960	4450	3367	2752	2452	2358	2407	2563	2806	3130	3535	4030	4633	5370	6280	7427	8908	9999	0	0	0	
1979 JUN 6.0	3592	3498	3398	3298	3197	3095	2994	2892	2790	2688	2586	2485	2384	2283	2183	2083	1984	1885	0	0	0	
JD 2444020.5	4979	3696	2934	2551	2410	2432	2571	2805	3122	3523	4015	4617	5354	6263	7414	8899	9999	0	0	0	0	
1979 MAY 27.0	3537	3438	3338	3238	3137	3035	2934	2832	2730	2628	2526	2425	2324	2223	2123	2023	1924	0	0	0	0	
JD 2444010.5	4089	3153	2669	2472	2463	2584	2807	3117	3514	4004	4604	5340	6250	7402	8889	9999	0	0	0	0	0	
1979 MAY 17.0	3477	3377	3277	3177	3076	2974	2873	2771	2669	2567	2465	2364	2263	2162	2062	1962	0	0	0	0	0	
JD 2444000.5	3418	2811	2548	2502	2604	2814	3117	3509	3997	4595	5330	6240	7392	8881	9999	0	0	0	0	0	0	
1979 MAY 7.0	3415	3316	3216	3115	3014	2913	2811	2709	2607	2505	2404	2302	2201	2100	2000	0	0	0	0	0	0	
JD 2443990.5	2982	2639	2551	2629	2827	3122	3509	3993	4589	5323	6233	7385	8875	9999	0	0	0	0	0	0	0	
1979 APR 27.0	3353	3254	3153	3053	2952	2850	2749	2647	2545	2443	2342	2240	2139	2038	0	0	0	0	0	0	0	
JD 2443980.5	2750	2611	2662	2845	3131	3513	3994	4589	5321	6231	7383	8873	9999	0	0	0	0	0	0	0	0	
1979 APR 17.0	3290	3191	3091	2990	2889	2788	2686	2584	2482	2381	2279	2177	2076	0	0	0	0	0	0	0	0	
JD 2443970.5	2684	2703	2869	3146	3523	4000	4592	5324	6233	7385	8876	9999	0	0	0	0	0	0	0	0	0	
1979 APR 7.0	3227	3128	3028	2927	2826	2725	2623	2521	2419	2318	2216	2115	0	0	0	0	0	0	0	0	0	
JD 2443960.5	2754	2900	3166	3537	4011	4601	5332	6240	7393	8885	9999	0	0	0	0	0	0	0	0	0	0	
1979 MAR 28.0	3164	3064	2964	2864	2763	2661	2560	2458	2356	2254	2153	0	0	0	0	0	0	0	0	0	0	
	(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)

JD2443800.5 1978 OCT 19.0 | JD2443840.5 1978 NOV 28.0 | JD2443880.5 1979 JAN 7.0 | JD2443920.5 1979 FEB 16.0 | JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

M14
E09

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444080.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671775	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.589	DEGREES
MEAN ANOM. AT EPOCH	=	200.512	DEGREES
DATE OF NODAL PASSAGE	=	2444140.131	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444080.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338657	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.400	DEGREES
ARG. OF PERIHELION	=	286.283	DEGREES
MEAN ANOM. AT EPOCH	=	67.833	DEGREES
DATE OF NODAL PASSAGE	=	2444072.529	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.059	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E09

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)
JD 2444080.5	1461	1696	2001	0	0	0	0	0	0	0	0	0	0	0	2148	1821	1593	1443	1364	1357	1238
1979 JUL 26.0	1356	1613	1943	0	0	0	0	0	0	0	0	0	0	0	2024	1654	1378	1173	1032	965	777
JD 2444070.5	1701	2014	0	0	0	0	0	0	0	0	0	0	0	2134	1805	1574	1418	1329	1309	1289	1181
1979 JUL 16.0	1610	1945	0	0	0	0	0	0	0	0	0	0	0	2019	1650	1374	1166	1018	937	835	743
JD 2444060.5	2024	0	0	0	0	0	0	0	0	0	0	0	0	2121	1790	1557	1396	1297	1264	1304	1229	1129
1979 JUL 6.0	1946	0	0	0	0	0	0	0	0	0	0	0	0	2014	1646	1371	1160	1006	914	900	798	715
JD 2444050.5	0	0	0	0	0	0	0	0	0	0	0	0	2108	1777	1541	1375	1269	1223	1248	1274	1174	1081
1979 JUN 26.0	0	0	0	0	0	0	0	0	0	0	0	0	2008	1643	1368	1156	998	895	865	852	768	691
JD 2444040.5	0	0	0	0	0	0	0	0	0	0	0	2095	1764	1526	1357	1244	1186	1195	1282	1217	1123	1035
1979 JUN 16.0	0	0	0	0	0	0	0	0	0	0	0	2003	1639	1364	1152	991	880	834	876	819	741	670
JD 2444030.5	0	0	0	0	0	0	0	0	0	0	2083	1752	0	1340	1222	1155	1148	1218	1257	1164	1076	992
1979 JUN 6.0	0	0	0	0	0	0	0	0	0	0	1996	1634	0	1149	985	868	809	832	868	790	718	651
JD 2444020.5	0	0	0	0	0	0	0	0	2072	1741	1501	1326	1202	1127	1106	1157	1295	1202	1115	1031	951
1979 MAY 27.0	0	0	0	0	0	0	0	0	1990	1630	1357	1146	981	859	788	792	916	837	764	697	634
JD 2444010.5	0	0	0	0	0	0	0	2063	1731	1490	1313	1186	1104	1071	1102	1219	1239	1151	1068	988	911
1979 MAY 17.0	0	0	0	0	0	0	0	1983	1625	1354	1143	977	851	771	757	838	882	809	741	678	618
JD 2444000.5	0	0	0	0	0	0	2054	1723	1481	1302	1171	1084	1040	1054	1150	1273	1186	1103	1023	947	873
1979 MAY 7.0	0	0	0	0	0	0	1976	1620	1350	1140	973	845	758	729	788	925	852	784	720	660	603
JD 2443990.5	0	0	0	0	0	2046	1715	1473	1293	1159	1067	1015	1014	1086	1251	1220	1137	1057	981	907	836
1979 APR 27.0	0	0	0	0	0	1969	1614	1346	1136	970	840	748	706	742	879	893	825	760	700	642	589
JD 2443980.5	0	0	0	0	2040	1709	1466	1285	1149	1053	994	980	1031	1175	1252	1169	1090	1013	939	868	800
1979 APR 17.0	0	0	0	0	1962	1609	1342	1133	966	835	739	687	703	820	932	864	799	738	680	626	575
JD 2443970.5	0	0	0	2035	1704	1461	1278	1141	1041	977	953	985	1103	1283	1201	1121	1045	971	899	831	765
1979 APR 7.0	0	0	0	1955	1604	1337	1129	963	831	732	672	671	763	969	901	836	775	717	662	610	561
JD 2443960.5	0	0	2032	1701	1457	1274	1135	1032	963	930	946	1039	1230	1232	1152	1075	1001	930	861	794	731
1979 MAR 28.0	0	0	1949	1598	1333	1125	960	827	726	660	645	712	882	936	871	810	752	696	644	594	548
(FLT T)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M14 E09

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	80	70	60	50	40	30	20	10	0	10	20	30	40	50	60	70	80	90	100	110	120
JD 2444080.5	155	213	203	0	0	0	0	0	0	0	0	0	0	0	-77	-55	-34	-14	3	20	-223
1979 JUL 26.0	422	486	565	0	0	0	0	0	0	0	0	0	0	0	3415	3469	3518	3564	5	44	2889
JD 2444070.5	164	178	0	0	0	0	0	0	0	0	0	0	0	0	-111	-90	-69	-49	-31	-14	-230	-225
1979 JUL 16.0	408	482	0	0	0	0	0	0	0	0	0	0	0	0	3328	3384	3435	3483	3526	3566	2805	2861
JD 2444060.5	135	0	0	0	0	0	0	0	0	0	0	0	0	-143	-123	-103	-84	-65	-48	-32	-230	-226
1979 JUL 6.0	406	0	0	0	0	0	0	0	0	0	0	0	0	3239	3297	3352	3401	3447	3488	3527	2775	2834
JD 2444050.5	0	0	0	0	0	0	0	0	0	0	0	0	-171	-153	-134	-116	-98	-82	-66	-231	-230	-227
1979 JUN 26.0	0	0	0	0	0	0	0	0	0	0	0	0	3148	3209	3266	3319	3367	3410	3451	2688	2747	2808
JD 2444040.5	0	0	0	0	0	0	0	0	0	0	0	-194	-179	-163	-146	-130	-114	-98	-83	-229	-229	-227
1979 JUN 16.0	0	0	0	0	0	0	0	0	0	0	0	3055	3119	3179	3234	3285	3331	3374	3414	2659	2719	2782
JD 2444030.5	0	0	0	0	0	0	0	0	0	0	-213	-201	0	-173	-158	-143	-129	-114	-223	-227	-228	-226
1979 JUN 6.0	0	0	0	0	0	0	0	0	0	0	2960	3026	0	3147	3201	3251	3297	3338	2570	2630	2693	2758
JD 2444020.5	0	0	0	0	0	0	0	0	0	-227	-219	-208	-196	-183	-170	-157	-144	-212	-219	-224	-226	-226
1979 MAY 27.0	0	0	0	0	0	0	0	0	0	2862	2932	2997	3058	3115	3168	3217	3262	2483	2541	2603	2667	2734
JD 2444010.5	0	0	0	0	0	0	0	0	-234	-230	-224	-215	-205	-194	-182	-170	-158	-207	-215	-221	-224	-224
1979 MAY 17.0	0	0	0	0	0	0	0	0	2764	2835	2903	2967	3027	3083	3135	3183	3225	2453	2514	2577	2643	2710
JD 2444000.5	0	0	0	0	0	0	0	-235	-236	-234	-229	-222	-214	-204	-194	-184	-190	-201	-210	-217	-222	-223
1979 MAY 7.0	0	0	0	0	0	0	0	2665	2737	2807	2873	2936	2995	3050	3102	3148	2366	2425	2487	2552	2619	2687
JD 2443990.5	0	0	0	0	0	0	-230	-236	-238	-237	-234	-229	-222	-215	-206	-197	-183	-195	-206	-214	-219	-221
1979 APR 27.0	0	0	0	0	0	0	2566	2639	2710	2778	2843	2905	2963	3018	3069	3108	2338	2398	2462	2527	2595	2665
JD 2443980.5	0	0	0	0	-219	-229	-236	-239	-240	-239	-235	-231	-225	-217	-161	-176	-189	-200	-209	-215	-218
1979 APR 17.0	0	0	0	0	2468	2541	2613	2682	2749	2813	2874	2932	2986	3031	2253	2311	2373	2437	2503	2572	2643
JD 2443970.5	0	0	0	-203	-217	-228	-236	-241	-243	-244	-242	-239	-234	-135	-152	-168	-183	-195	-205	-212	-215
1979 APR 7.0	0	0	0	2371	2444	2516	2586	2654	2720	2782	2843	2901	2951	2170	2226	2286	2348	2413	2480	2550	2621
JD 2443960.5	0	0	-181	-199	-215	-227	-236	-242	-246	-248	-248	-247	-242	-126	-144	-161	-176	-190	-200	-208	-212
1979 MAR 28.0	0	0	2277	2350	2421	2491	2560	2626	2690	2753	2813	2869	2908	2143	2201	2261	2324	2390	2458	2528	2599

(FLT T)	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E09

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	80	70	60	50	40	30	20	10	0	10	20	30	40	50	60	70	80	90	100	110	120
JD 2444080.5	148	115	124	0	0	0	0	0	0	0	0	0	0	0	-63	-45	-23	5	42	84	217
1979 JUL 26.0	1423	1438	1472	0	0	0	0	0	0	0	0	0	0	0	3458	3500	3551	16	98	194	650
JD 2444070.5	153	150	0	0	0	0	0	0	0	0	0	0	0	-86	-69	-48	-20	14	58	210	215
1979 JUL 16.0	1382	1410	0	0	0	0	0	0	0	0	0	0	0	3404	3446	3496	3558	38	135	594	638
JD 2444060.5	184	0	0	0	0	0	0	0	0	0	0	0	0	-108	-92	-73	-47	-13	29	75	207	212
1979 JUL 6.0	1349	0	0	0	0	0	0	0	0	0	0	0	0	3349	3390	3439	3499	3577	73	178	581	622
JD 2444050.5	0	0	0	0	0	0	0	0	0	0	0	0	-130	-115	-97	-74	-42	-0	47	196	203	209
1979 JUN 26.0	0	0	0	0	0	0	0	0	0	0	0	0	3293	3333	3380	3439	3514	9	118	521	563	602
JD 2444040.5	0	0	0	0	0	0	0	0	0	0	0	-150	-137	-121	-100	-71	-31	17	64	192	199	204
1979 JUN 16.0	0	0	0	0	0	0	0	0	0	0	0	3234	3274	3320	3378	3451	3543	53	158	504	543	580
JD 2444030.5	0	0	0	0	0	0	0	0	0	0	-170	-158	0	-125	-99	-62	-15	36	177	186	193	199
1979 JUN 6.0	0	0	0	0	0	0	0	0	0	0	3173	3213	0	3315	3386	3476	3586	100	443	482	519	554
JD 2444020.5	0	0	0	0	0	0	0	0	0	-187	-177	-165	-148	-125	-93	-48	5	160	171	179	187	192
1979 MAY 27.0	0	0	0	0	0	0	0	0	0	3111	3150	3195	3251	3320	3407	3516	37	381	421	458	493	525
JD 2444010.5	0	0	0	0	0	0	0	0	-203	-195	-184	-170	-150	-121	-80	-28	20	153	163	172	179	184
1979 MAY 17.0	0	0	0	0	0	0	0	0	3046	3085	3130	3184	3252	3337	3444	3568	76	359	396	431	464	494
JD 2444000.5	0	0	0	0	0	0	0	-216	-210	-201	-189	-173	-148	-112	-62	-9	132	144	154	163	170	175
1979 MAY 7.0	0	0	0	0	0	0	0	2979	3017	3062	3116	3182	3265	3370	3495	16	297	334	369	402	433	461
JD 2443990.5	0	0	0	0	0	0	-227	-222	-216	-206	-193	-172	-141	-96	-42	-1	123	134	144	153	160	165
1979 APR 27.0	0	0	0	0	0	0	2910	2948	2993	3046	3111	3192	3294	3419	3549	36	272	307	340	371	400	427
JD 2443980.5	0	0	0	0	0	-235	-232	-227	-220	-210	-194	-168	-128	-76	-29	100	112	124	133	142	148	154
1979 APR 17.0	0	0	0	0	0	2839	2878	2922	2974	3038	3117	3217	3341	3477	3583	211	245	278	308	338	365	391
JD 2443970.5	0	0	0	0	-239	-238	-236	-231	-224	-212	-191	-158	-109	-59	75	89	101	112	121	129	136	141
1979 APR 7.0	0	0	0	0	2767	2805	2849	2900	2963	3040	3138	3260	3399	3522	149	183	216	246	276	303	329	353
JD 2443960.5	0	0	-240	-241	-240	-239	-235	-226	-211	-184	-142	-91	-56	63	76	88	99	108	116	122	127
1979 MAR 28.0	0	0	2695	2732	2775	2825	2887	2962	3056	3178	3318	3453	3528	121	154	185	214	241	267	292	315

(FLT T)	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E09

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)
JD 2444080.5 1979 JUL 26.0	2080	2080	2080	0	0	0	0	0	0	0	0	0	0	0	2080	2080	2080	2080	2080	2080	2080
JD 2444070.5 1979 JUL 16.0	2115	2115	0	0	0	0	0	0	0	0	0	0	0	2115	2115	2115	2115	2115	2115	2115	2115
JD 2444060.5 1979 JUL 6.0	2146	0	0	0	0	0	0	0	0	0	0	0	2146	2146	2146	2146	2146	2146	2146	2146	2146
JD 2444050.5 1979 JUN 26.0	0	0	0	0	0	0	0	0	0	0	0	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173
JD 2444040.5 1979 JUN 16.0	0	0	0	0	0	0	0	0	0	0	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198
JD 2444030.5 1979 JUN 6.0	0	0	0	0	0	0	0	0	0	2220	2220	0	2220	2220	2220	2220	2220	2220	2220	2220	2220
JD 2444020.5 1979 MAY 27.0	0	0	0	0	0	0	0	0	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239
JD 2444010.5 1979 MAY 17.0	0	0	0	0	0	0	0	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257
JD 2444000.5 1979 MAY 7.0	0	0	0	0	0	0	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273
JD 2443990.5 1979 APR 27.0	0	0	0	0	0	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287
JD 2443980.5 1979 APR 17.0	0	0	0	0	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301
JD 2443970.5 1979 APR 7.0	0	0	0	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313
JD 2443960.5 1979 MAR 28.0	0	0	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325

(FLT T)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E09

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)
JD 2444080.5	270	270	270	0	0	0	0	0	0	0	0	0	0	0	270	270	270	270	270	270	270
1979 JUL 26.0	416	416	416	0	0	0	0	0	0	0	0	0	0	0	416	416	416	416	416	416	416
JD 2444070.5	257	257	0	0	0	0	0	0	0	0	0	0	0	257	257	257	257	257	257	257	257
1979 JUL 16.0	389	389	0	0	0	0	0	0	0	0	0	0	0	389	389	389	389	389	389	389	389
JD 2444060.5	244	0	0	0	0	0	0	0	0	0	0	0	244	244	244	244	244	244	244	244	244
1979 JUL 6.0	363	0	0	0	0	0	0	0	0	0	0	0	363	363	363	363	363	363	363	363	363
JD 2444050.5	0	0	0	0	0	0	0	0	0	0	0	231	231	231	231	231	231	231	231	231	231
1979 JUN 26.0	0	0	0	0	0	0	0	0	0	0	0	339	339	339	339	339	339	339	339	339	339
JD 2444040.5	0	0	0	0	0	0	0	0	0	0	217	217	217	217	217	217	217	217	217	217	217
1979 JUN 16.0	0	0	0	0	0	0	0	0	0	0	315	315	315	315	315	315	315	315	315	315	315
JD 2444030.5	0	0	0	0	0	0	0	0	0	204	204	0	204	204	204	204	204	204	204	204	204
1979 JUN 6.0	0	0	0	0	0	0	0	0	0	293	293	0	293	293	293	293	293	293	293	293	293
JD 2444020.5	0	0	0	0	0	0	0	0	190	190	190	190	190	190	190	190	190	190	190	190	190
1979 MAY 27.0	0	0	0	0	0	0	0	0	271	271	271	271	271	271	271	271	271	271	271	271	271
JD 2444010.5	0	0	0	0	0	0	0	176	176	176	176	176	176	176	176	176	176	176	176	176	176
1979 MAY 17.0	0	0	0	0	0	0	0	249	249	249	249	249	249	249	249	249	249	249	249	249	249
JD 2444000.5	0	0	0	0	0	0	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
1979 MAY 7.0	0	0	0	0	0	0	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228
JD 2443990.5	0	0	0	0	0	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148
1979 APR 27.0	0	0	0	0	0	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207
JD 2443980.5	0	0	0	0	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134
1979 APR 17.0	0	0	0	0	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187
JD 2443970.5	0	0	0	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
1979 APR 7.0	0	0	0	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167
JD 2443960.5	0	0	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105
1979 MAR 28.0	0	0	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146

(FLT T)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E09

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)
JD 2444080.5	1880	1783	1687	0	0	0	0	0	0	0	0	0	0	0	3065	3164	3262	3362	3461	3562	63
1979 JUL 26.0	-874	-831	-788	0	0	0	0	0	0	0	0	0	0	0	-1544	-1596	-1647	-1698	-1746	-1786	1787
JD 2444070.5	1824	1727	0	0	0	0	0	0	0	0	0	0	0	0	3023	3121	3219	3318	3417	3517	17	118
1979 JUL 16.0	-854	-811	0	0	0	0	0	0	0	0	0	0	0	0	-1523	-1575	-1628	-1679	-1728	-1771	1796	1771
JD 2444060.5	1767	0	0	0	0	0	0	0	0	0	0	0	0	0	2983	3080	3178	3276	3374	3474	3574	74	175
1979 JUL 6.0	-834	0	0	0	0	0	0	0	0	0	0	0	0	0	-1504	-1556	-1608	-1660	-1710	-1756	-1792	1781	1753
JD 2444050.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2944	3040	3137	3235	3333	3432	3531	31	132	232
1979 JUN 26.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1485	-1537	-1589	-1642	-1693	-1741	-1781	1792	1763	1733
JD 2444040.5	0	0	0	0	0	0	0	0	0	0	2906	3002	3099	3196	3293	3392	3490	3588	90	190	291
1979 JUN 16.0	0	0	0	0	0	0	0	0	0	0	-1466	-1518	-1571	-1624	-1676	-1726	-1769	-1797	1774	1743	1711
JD 2444030.5	0	0	0	0	0	0	0	0	0	2869	2965	0	3158	3255	3353	3451	3549	50	149	249	350
1979 JUN 6.0	0	0	0	0	0	0	0	0	0	-1448	-1501	0	-1606	-1659	-1710	-1757	-1790	1785	1754	1722	1688
JD 2444020.5	0	0	0	0	0	0	0	0	2834	2929	3025	3121	3218	3315	3413	3511	14	110	209	309	410
1979 MAY 27.0	0	0	0	0	0	0	0	0	-1431	-1483	-1536	-1589	-1642	-1694	-1744	-1782	1796	1766	1733	1699	1665
JD 2444010.5	0	0	0	0	0	0	0	2799	2895	2990	3086	3182	3279	3376	3473	3570	72	170	270	370	471
1979 MAY 17.0	0	0	0	0	0	0	0	-1414	-1466	-1519	-1572	-1626	-1679	-1730	-1773	-1797	1777	1744	1710	1675	1640
JD 2444000.5	0	0	0	0	0	0	2765	2861	2956	3052	3148	3244	3340	3437	3534	36	133	232	332	432	533
1979 MAY 7.0	0	0	0	0	0	0	-1398	-1450	-1503	-1556	-1609	-1663	-1716	-1763	-1794	1788	1756	1721	1686	1651	1616
JD 2443990.5	0	0	0	0	0	2732	2828	2923	3018	3114	3210	3306	3402	3499	3586	97	195	294	394	494	595
1979 APR 27.0	0	0	0	0	0	-1382	-1434	-1487	-1540	-1594	-1648	-1701	-1751	-1789	1799	1767	1733	1697	1662	1626	1591
JD 2443980.5	0	0	0	0	2700	2795	2890	2986	3081	3177	3272	3368	3465	3560	62	159	258	357	457	557	658
1979 APR 17.0	0	0	0	0	-1366	-1418	-1471	-1524	-1578	-1632	-1687	-1739	-1783	1797	1779	1744	1709	1673	1637	1601	1566
JD 2443970.5	0	0	0	2667	2763	2858	2953	3049	3144	3240	3335	3431	3527	30	124	222	321	420	520	620	721
1979 APR 7.0	0	0	0	-1350	-1403	-1456	-1509	-1563	-1617	-1672	-1726	-1774	1797	1789	1756	1721	1685	1648	1612	1576	1541
JD 2443960.5	0	0	2635	2730	2826	2921	3017	3112	3207	3303	3398	3494	3581	91	187	285	384	483	583	683	784
1979 MAR 28.0	0	0	-1335	-1387	-1440	-1494	-1548	-1602	-1657	-1712	-1763	1799	1796	1768	1733	1696	1660	1624	1587	1552	1516

(FLT T)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E09

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	80	70	60	50	40	30	20	10	0	10	20	30	40	50	60	70	80	90	100	110	120
JD 2444080.5	103	480	73	0	0	0	0	0	0	0	0	0	0	0	18	21	26	35	60	214	131
1979 JUL 26.0	1502	1878	2466	0	0	0	0	0	0	0	0	0	0	0	1062	1023	999	989	991	999	993
JD 2444070.5	88	29	0	0	0	0	0	0	0	0	0	0	0	4	5	6	8	12	25	120	18
1979 JUL 16.0	1814	2368	0	0	0	0	0	0	0	0	0	0	0	1072	1027	998	984	984	994	999	979
JD 2444060.5	385	0	0	0	0	0	0	0	0	0	0	0	25	28	33	41	57	100	474	170	73
1979 JUL 6.0	2274	0	0	0	0	0	0	0	0	0	0	0	1083	1032	998	980	977	986	999	992	960
JD 2444050.5	0	0	0	0	0	0	0	0	0	0	0	44	48	56	68	89	139	335	736	177	102
1979 JUN 26.0	0	0	0	0	0	0	0	0	0	0	0	1094	1038	999	976	968	976	993	999	977	937
JD 2444040.5	0	0	0	0	0	0	0	0	0	0	62	68	76	90	114	164	307	2947	374	179	120
1979 JUN 16.0	0	0	0	0	0	0	0	0	0	0	1105	1043	999	972	960	964	983	1000	989	958	911
JD 2444030.5	0	0	0	0	0	0	0	0	0	80	85	0	109	135	182	296	862	885	296	181	133
1979 JUN 6.0	0	0	0	0	0	0	0	0	0	1117	1049	0	968	952	952	969	994	997	974	935	884
JD 2444020.5	0	0	0	0	0	0	0	0	96	101	111	126	151	196	291	602	4365	492	262	182	142
1979 MAY 27.0	0	0	0	0	0	0	0	0	1130	1055	1001	965	944	940	954	982	1000	986	954	909	855
JD 2444010.5	0	0	0	0	0	0	0	112	116	126	141	165	207	288	501	2140	885	375	242	182	150
1979 MAY 17.0	0	0	0	0	0	0	0	1142	1062	1003	962	937	929	938	966	997	994	969	930	881	826
JD 2444000.5	0	0	0	0	0	0	126	130	139	153	176	215	286	447	1099	2047	545	318	229	183	156
1979 MAY 7.0	0	0	0	0	0	0	1155	1069	1005	959	930	918	923	948	986	998	981	948	904	852	796
JD 2443990.5	0	0	0	0	0	139	143	150	164	186	221	284	412	796	8016	831	417	284	219	183	162
1979 APR 27.0	0	0	0	0	0	1169	1076	1007	958	925	908	908	928	968	999	990	963	924	876	822	766
JD 2443980.5	0	0	0	0	152	154	160	173	193	225	280	386	650	2213	1415	554	349	260	212	184	166
1979 APR 17.0	0	0	0	0	1184	1084	1010	956	920	899	895	910	947	993	996	975	941	897	846	792	736
JD 2443970.5	0	0	0	163	163	169	180	198	227	276	365	560	1285	3225	756	430	306	243	206	184	171
1979 APR 7.0	0	0	0	1199	1093	1014	956	915	891	882	892	925	977	999	985	956	916	869	816	762	706
JD 2443960.5	0	0	172	171	175	185	201	227	270	345	497	934	6491	1092	533	358	276	229	201	184	175
1979 MAR 28.0	0	0	1216	1102	1018	956	912	884	871	876	904	955	998	992	968	933	889	839	786	732	677

(FLT T) 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E09

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	80	70	60	50	40	30	20	10	0	10	20	30	40	50	60	70	80	90	100	110	120
JD 2444080.5	430	429	431	0	0	0	0	0	0	0	0	0	0	0	30	30	27	20	10	1	-4
1979 JUL 26.0	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0-9999	-9999	-9999	-3463	-2172	-1769	1543	
JD 2444070.5	409	409	0	0	0	0	0	0	0	0	0	0	0	35	36	34	28	17	5	0	-15
1979 JUL 16.0	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0-9999	-9999	-9999	-3493	-2169	-1751	1536	1559	
JD 2444060.5	388	0	0	0	0	0	0	0	0	0	0	0	40	43	41	36	26	12	1	-5	-31
1979 JUL 6.0	-9999	0	0	0	0	0	0	0	0	0	0	0-9999	-9999	-9999	-3547	-2178	-1742	-1565	1555	1576	
JD 2444050.5	0	0	0	0	0	0	0	0	0	0	0	46	49	49	45	35	21	5	-0	-17	-51
1979 JUN 26.0	0	0	0	0	0	0	0	0	0	0	0-9999	-9999	-9999	-3623	-2197	-1743	-1552	1550	1574	1594	
JD 2444040.5	0	0	0	0	0	0	0	0	0	0	52	56	57	53	45	32	13	0	-7	-33	-74
1979 JUN 16.0	0	0	0	0	0	0	0	0	0	0-9999	-9999	-9999	-3719	-2225	-1750	-1546	-1464	1572	1594	1612	
JD 2444030.5	0	0	0	0	0	0	0	0	0	57	63	0	63	56	43	24	4	-2	-20	-54	-99
1979 JUN 6.0	0	0	0	0	0	0	0	0	0-9999	-9999	0-3836	-2261	-1763	-1546	-1453	1569	1594	1614	1629		
JD 2444020.5	0	0	0	0	0	0	0	0	63	69	73	72	66	55	37	13	0	-10	-37	-77	-128
1979 MAY 27.0	0	0	0	0	0	0	0	0-9999	-9999	-9999	-3975	-2304	-1782	-1550	-1447	1566	1593	1616	1633	1646	
JD 2444010.5	0	0	0	0	0	0	0	69	76	80	81	77	67	50	25	2	-4	-24	-58	-104	-158
1979 MAY 17.0	0	0	0	0	0	0	0-9999	-9999	-9999	-4139	-2354	-1806	-1560	-1445	-1408	1592	1617	1637	1652	1662	
JD 2444000.5	0	0	0	0	0	0	75	83	88	90	87	79	63	39	10	-0	-14	-43	-83	-133	-190
1979 MAY 7.0	0	0	0	0	0	0-9999	-9999	-9999	-4331	-2412	-1834	-1573	-1447	-1401	1590	1618	1640	1657	1670	1678	
JD 2443990.5	0	0	0	0	0	82	90	96	99	97	90	77	54	22	1	-7	-30	-65	-110	-164	-224
1979 APR 27.0	0	0	0	0	0-9999	-9999	-9999	-4558	-2478	-1866	-1591	-1453	-1397	1395	1618	1643	1662	1676	1686	1692	
JD 2443980.5	0	0	0	0	88	97	104	107	107	102	90	69	38	5	-2	-20	-50	-90	-140	-197	-259
1979 APR 17.0	0	0	0	0-9999	-9999	-9999	-4827	-2553	-1904	-1612	-1463	-1397	1389	1618	1645	1666	1683	1695	1702	1706	
JD 2443970.5	0	0	0	94	105	112	116	117	112	102	84	54	16	-0	-12	-37	-73	-119	-172	-231	-295
1979 APR 7.0	0	0	0-9999	-9999	-9999	-5155	-2639	-1946	-1636	-1476	-1400	1385	1618	1647	1671	1689	1703	1712	1717	1718	
JD 2443960.5	0	0	101	112	120	125	126	123	115	98	71	32	1	-6	-26	-58	-100	-149	-206	-267	-332
1979 MAR 28.0	0	0-9999	-9999	-9999	-5560	-2737	-1994	-1665	-1493	-1406	1382	1398	1649	1675	1695	1710	1721	1728	1731	1730	

(FLT T)	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

M14
E09

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	80	70	60	50	40	30	20	10	0	10	20	30	40	50	60	70	80	90	100	110	120
JD 2444080.5	184	163	140	0	0	0	0	0	0	0	0	0	0	0	1249	1301	1431	1715	2485	7666	63
1979 JUL 26.0	114	100	86	0	0	0	0	0	0	0	0	0	0	0	151	167	181	195	208	219	86
JD 2444070.5	172	149	0	0	0	0	0	0	0	0	0	0	0	1136	1169	1257	1441	1872	3472	63	67
1979 JUL 16.0	103	89	0	0	0	0	0	0	0	0	0	0	0	150	166	180	194	207	219	87	93
JD 2444060.5	159	0	0	0	0	0	0	0	0	0	0	0	1042	1063	1124	1249	1514	2263	9180	67	71
1979 JUL 6.0	91	0	0	0	0	0	0	0	0	0	0	0	149	165	179	193	206	218	229	93	99
JD 2444050.5	0	0	0	0	0	0	0	0	0	0	0	962	975	1019	1107	1281	1699	3472	67	71	74
1979 JUN 26.0	0	0	0	0	0	0	0	0	0	0	0	148	164	178	192	205	218	229	93	99	105
JD 2444040.5	0	0	0	0	0	0	0	0	0	0	894	902	934	998	1119	1378	2169	9999	71	74	78
1979 JUN 16.0	0	0	0	0	0	0	0	0	0	0	147	163	177	191	204	217	229	238	99	105	111
JD 2444030.5	0	0	0	0	0	0	0	0	0	835	840	0	913	1000	1172	1605	3925	71	74	78	82
1979 JUN 6.0	0	0	0	0	0	0	0	0	0	146	161	0	190	203	216	228	238	99	105	111	117
JD 2444020.5	0	0	0	0	0	0	0	0	783	786	806	844	909	1030	1295	2230	71	74	78	81	85
1979 MAY 27.0	0	0	0	0	0	0	0	0	145	160	175	188	202	215	227	238	99	105	111	117	123
JD 2444010.5	0	0	0	0	0	0	0	737	740	756	787	838	926	1102	1592	5615	74	77	81	85	89
1979 MAY 17.0	0	0	0	0	0	0	0	144	159	173	187	201	213	226	237	247	105	110	116	122	129
JD 2444000.5	0	0	0	0	0	0	696	699	713	738	779	847	971	1265	2560	74	77	81	84	88	92
1979 MAY 7.0	0	0	0	0	0	0	143	158	172	186	199	212	225	236	247	105	110	116	122	128	135
JD 2443990.5	0	0	0	0	0	659	662	675	697	731	785	877	1069	1691	9999	77	80	84	88	92	96
1979 APR 27.0	0	0	0	0	0	141	156	171	184	198	211	223	235	246	255	110	116	122	128	134	140
JD 2443980.5	0	0	0	0	625	629	641	661	696	734	805	940	1296	3592	77	80	83	87	91	95	99
1979 APR 17.0	0	0	0	0	140	155	169	183	196	209	222	234	245	255	110	116	121	127	133	140	146
JD 2443970.5	0	0	0	594	599	611	629	655	692	749	848	1075	2001	77	80	83	86	90	94	98	103
1979 APR 7.0	0	0	0	139	154	168	182	195	208	220	233	244	254	110	116	121	127	133	139	146	152
JD 2443960.5	0	0	565	572	583	600	624	656	703	780	936	1422	6775	80	83	86	89	93	97	102	106
1979 MAR 28.0	0	0	138	152	166	180	193	206	219	231	243	254	262	115	121	127	132	138	145	151	158

(FLT T)	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE — EARTH - MARS TRAJECTORY PARAMETERS — M14 E09

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)
JD 2444080.5 1979 JUL 26.0	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524
JD 2444070.5 1979 JUL 16.0	772	772	0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524
JD 2444060.5 1979 JUL 6.0	772	0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444050.5 1979 JUN 26.0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444040.5 1979 JUN 16.0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444030.5 1979 JUN 6.0	0	0	0	0	0	0	0	0	0	1524	1524	0	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444020.5 1979 MAY 27.0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444010.5 1979 MAY 17.0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444000.5 1979 MAY 7.0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2443990.5 1979 APR 27.0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2443980.5 1979 APR 17.0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2443970.5 1979 APR 7.0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2443960.5 1979 MAR 28.0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524

(FLT T)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)

JD2444000.5 1979 MAY 7.0 — JD2444040.5 1979 JUN 16.0 — JD2444080.5 1979 JUL 26.0 — JD2444120.5 1979 SEP 4.0 — JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

M14
E09

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)
JD 2444080.5	3715	4395	5289	0	0	0	0	0	0	0	0	0	0	0	4971	4011	3349	2915	2686	2667	2327
1979 JUL 26.0	3742	4504	5484	0	0	0	0	0	0	0	0	0	0	0	5724	4625	3809	3202	2787	2587	2038
JD 2444070.5	4411	5325	0	0	0	0	0	0	0	0	0	0	0	4929	3965	3295	2843	2586	2528	2471	2164
1979 JUL 16.0	4496	5490	0	0	0	0	0	0	0	0	0	0	0	5709	4614	3797	3181	2744	2507	2207	1939
JD 2444060.5	5355	0	0	0	0	0	0	0	0	0	0	0	0	4889	3923	3244	2778	2495	2399	2516	2300	2016
1979 JUL 6.0	5494	0	0	0	0	0	0	0	0	0	0	0	0	5694	4604	3787	3165	2711	2439	2398	2100	1857
JD 2444050.5	0	0	0	0	0	0	0	0	0	0	0	0	4850	3883	3198	2719	2414	2283	2354	2428	2144	1880
1979 JUN 26.0	0	0	0	0	0	0	0	0	0	0	0	0	5678	4592	3777	3152	2685	2383	2295	2257	2010	1786
JD 2444040.5	0	0	0	0	0	0	0	0	0	0	0	4814	3845	3156	2666	2342	2179	2204	2453	2266	2001	1752
1979 JUN 16.0	0	0	0	0	0	0	0	0	0	0	0	5660	4581	3768	3141	2664	2339	2205	2328	2159	1932	1725
JD 2444030.5	0	0	0	0	0	0	0	0	0	4779	3811	0	2619	2280	2089	2070	2268	2380	2116	1867	1632
1979 JUN 6.0	0	0	0	0	0	0	0	0	0	5642	4568	0	3131	2648	2304	2130	2198	2304	2075	1864	1671
JD 2444020.5	0	0	0	0	0	0	0	0	4748	3779	3081	2577	2225	2011	1952	2095	2488	2225	1976	1741	1518
1979 MAY 27.0	0	0	0	0	0	0	0	0	5623	4554	3747	3122	2635	2276	2069	2081	2443	2212	2000	1803	1621
JD 2444010.5	0	0	0	0	0	0	0	4718	3750	3050	2541	2177	1945	1852	1940	2272	2328	2080	1845	1621	1408
1979 MAY 17.0	0	0	0	0	0	0	0	5602	4540	3736	3113	2624	2255	2021	1980	2215	2345	2131	1932	1747	1575
JD 2444000.5	0	0	0	0	0	0	4693	3725	3023	2509	2137	1888	1767	1806	2075	2427	2180	1944	1719	1506	1303
1979 MAY 7.0	0	0	0	0	0	0	5582	4524	3725	3103	2613	2237	1983	1897	2068	2472	2257	2057	1870	1695	1532
JD 2443990.5	0	0	0	0	0	4670	3703	3000	2482	2102	1841	1696	1693	1897	2365	2275	2039	1814	1600	1396	1202
1979 APR 27.0	0	0	0	0	0	5561	4508	3713	3094	2603	2222	1952	1829	1936	2337	2378	2177	1988	1811	1645	1491
JD 2443980.5	0	0	0	0	4652	3685	2981	2459	2074	1801	1638	1599	1742	2147	2367	2131	1906	1691	1485	1290	1104
1979 APR 17.0	0	0	0	0	5540	4492	3700	3083	2593	2208	1927	1775	1823	2162	2493	2291	2102	1924	1756	1598	1450
JD 2443970.5	0	0	0	4637	3671	2966	2442	2051	1769	1589	1523	1612	1943	2456	2221	1995	1779	1572	1375	1188	1010
1979 APR 7.0	0	0	0	5520	4476	3687	3072	2583	2196	1906	1731	1729	1996	2601	2400	2210	2031	1862	1702	1552	1411
JD 2443960.5	0	0	4628	3661	2955	2428	2033	1744	1551	1461	1505	1762	2304	2308	2082	1866	1658	1459	1269	1089	919
1979 MAR 29.0	0	0	5502	4461	3675	3061	2573	2184	1888	1695	1652	1848	2345	2503	2313	2134	1963	1802	1650	1507	1373

(FLT T)(40)(50)(60)(70)(80)(90)(100)(110)(120)(130)(140)(150)(160)(170)(180)(190)(200)(210)(220)(230)(240)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M14 E09

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)
JD 2444080.5	7457	8900	9999	0	0	0	0	0	0	0	0	0	0	0	9999	8636	7159	6117	5473	5254	4365
1979 JUL 26.0	1880	1783	1687	0	0	0	0	0	0	0	0	0	0	0	3065	3164	3262	3362	3461	3562	63
JD 2444070.5	8907	9999	0	0	0	0	0	0	0	0	0	0	0	9999	8580	7092	6024	5330	5035	4679	4103
1979 JUL 16.0	1824	1727	0	0	0	0	0	0	0	0	0	0	0	3023	3121	3219	3318	3417	3517	17	118
JD 2444060.5	9999	0	0	0	0	0	0	0	0	0	0	0	0	9999	8526	7031	5942	5205	4838	4914	4400	3873
1979 JUL 6.0	1767	0	0	0	0	0	0	0	0	0	0	0	0	2983	3080	3178	3276	3374	3474	3574	74	175
JD 2444050.5	0	0	0	0	0	0	0	0	0	0	0	0	9999	8475	6975	5871	5098	4666	4649	4685	4154	3666
1979 JUN 26.0	0	0	0	0	0	0	0	0	0	0	0	0	2944	3040	3137	3235	3333	3432	3531	31	132	232
JD 2444040.5	0	0	0	0	0	0	0	0	0	0	0	9999	8426	6924	5807	5007	4518	4409	4781	4425	3933	3478
1979 JUN 16.0	0	0	0	0	0	0	0	0	0	0	0	2906	3002	3099	3196	3293	3392	3490	3588	90	190	291
JD 2444030.5	0	0	0	0	0	0	0	0	0	0	9999	8379	0	5750	4928	4393	4200	4467	4684	4191	3732	3303
1979 JUN 6.0	0	0	0	0	0	0	0	0	0	0	2869	2965	0	3158	3255	3353	3451	3549	50	149	249	350
JD 2444020.5	0	0	0	0	0	0	0	0	0	9999	8333	6828	5699	4860	4288	4021	4176	4931	4437	3976	3544	3139
1979 MAY 27.0	0	0	0	0	0	0	0	0	0	2834	2929	3025	3121	3218	3315	3413	3511	14	110	209	309	410
JD 2444010.5	0	0	0	0	0	0	0	0	9999	8290	6786	5654	4801	4199	3873	3920	4487	4674	4211	3777	3368	2984
1979 MAY 17.0	0	0	0	0	0	0	0	0	2799	2895	2990	3086	3182	3279	3376	3473	3570	72	170	270	370	471
JD 2444000.5	0	0	0	0	0	0	0	9999	8249	6749	5613	4750	4125	3750	3703	4143	4899	4437	4001	3589	3201	2835
1979 MAY 7.0	0	0	0	0	0	0	0	2765	2861	2956	3052	3148	3244	3340	3437	3534	36	133	232	332	432	533
JD 2443990.5	0	0	0	0	0	0	9999	8212	6713	5576	4706	4063	3648	3522	3832	4701	4653	4216	3803	3411	3041	2693
1979 APR 27.0	0	0	0	0	0	0	2732	2828	2923	3018	3114	3210	3306	3402	3499	3586	97	195	294	394	494	595
JD 2443980.5	0	0	0	0	0	9999	8177	6681	5542	4667	4010	3565	3374	3564	4309	4859	4423	4008	3614	3241	2888	2555
1979 APR 17.0	0	0	0	0	0	2700	2795	2890	2986	3081	3177	3272	3368	3465	3560	62	159	258	357	457	557	658
JD 2443970.5	0	0	0	0	9999	8147	6653	5514	4634	3965	3495	3254	3340	3939	5057	4621	4206	3810	3434	3077	2739	2421
1979 APR 7.0	0	0	0	0	2667	2763	2858	2953	3049	3144	3240	3335	3431	3527	30	124	222	321	420	520	620	721
JD 2443960.5	0	0	0	9999	8122	6630	5490	4606	3928	3439	3156	3157	3610	4649	4811	4396	3999	3621	3260	2919	2596	2292
1979 MAR 28.0	0	0	0	2635	2730	2826	2921	3017	3112	3207	3303	3398	3494	3581	91	187	285	384	483	583	683	784

(FLT T)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

M14
E10

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444180.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671764	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.594	DEGREES
MEAN ANOM. AT EPOCH	=	299.072	DEGREES
DATE OF NODAL PASSAGE	=	2444140.127	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444180.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338682	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.402	DEGREES
ARG. OF PERIHELION	=	286.286	DEGREES
MEAN ANOM. AT EPOCH	=	120.235	DEGREES
DATE OF NODAL PASSAGE	=	2444072.526	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.060	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E10

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
JD 2444080.5	1238	1130	1030	937	849	767	690	619	552	490	433	380	332	288	248	212	180	159	132	114	105
1979 JUL 26.0	777	687	607	536	471	414	362	316	275	239	207	180	158	139	123	111	102	94	99	92	90
JD 2444070.5	1181	1081	987	899	816	738	665	597	533	474	419	368	322	280	241	206	176	150	128	112	104
1979 JUL 16.0	743	662	588	522	461	407	358	314	275	240	210	184	162	144	129	117	109	99	96	94	92
JD 2444060.5	1129	1035	947	863	784	710	640	575	514	457	405	356	312	271	234	201	210	148	125	111	104
1979 JUL 6.0	715	640	572	509	453	401	355	313	275	242	213	188	167	149	135	126	162	103	100	98	97
JD 2444050.5	1081	992	908	829	754	683	616	554	495	441	390	344	301	262	227	206	196	144	123	110	105
1979 JUN 26.0	691	621	557	499	445	396	352	312	276	245	217	193	173	156	144	149	129	109	105	103	103
JD 2444040.5	1035	951	871	796	724	656	592	532	476	424	376	331	291	254	226	1450	171	140	121	109	106
1979 JUN 16.0	670	605	544	489	438	392	349	311	277	247	220	198	179	164	160	1107	125	116	112	111	111
JD 2444030.5	992	912	836	763	695	630	569	511	458	408	362	319	281	249	292	223	161	136	118	109	108
1979 JUN 6.0	651	590	533	480	432	387	347	311	278	249	224	203	186	177	236	159	131	124	120	119	120
JD 2444020.5	951	875	802	732	666	604	545	491	439	391	347	307	273	264	463	190	154	131	116	109	110
1979 MAY 27.0	634	576	522	472	426	384	345	310	279	252	228	209	196	208	343	151	138	132	129	126	129
JD 2444010.5	911	838	768	702	638	579	523	470	421	375	333	296	274	665	235	176	147	127	114	110	114
1979 MAY 17.0	618	563	512	464	420	380	343	310	281	255	233	217	214	543	184	155	146	141	138	138	140
JD 2444000.5	873	803	736	672	611	554	500	449	402	359	320	291	342	347	203	165	140	122	113	112	120
1979 MAY 7.0	603	551	502	456	414	376	341	310	282	258	239	229	286	269	177	162	154	150	148	149	152
JD 2443990.5	836	768	704	642	584	529	477	429	384	344	310	308	1013	240	186	155	134	119	113	115	127
1979 APR 27.0	589	539	492	449	409	372	339	310	284	262	247	260	793	207	181	170	163	159	158	160	165
JD 2443980.5	800	735	673	614	558	505	455	409	367	330	311	576	307	210	172	147	128	117	114	121	137
1979 APR 17.0	575	527	483	441	404	369	338	310	286	267	264	481	259	202	187	178	172	170	170	173	179
JD 2443970.5	765	702	642	585	532	481	434	390	351	323	372	503	240	191	161	139	123	116	117	129	149
1979 APR 7.0	561	516	473	434	398	365	336	310	289	277	325	409	229	205	194	186	182	181	182	187	195
JD 2443960.5	731	670	612	558	506	458	412	371	338	337	1448	284	212	176	150	131	120	117	124	140	164
1979 MAR 28.0	548	505	464	427	393	362	334	311	294	302	1168	265	226	211	201	195	192	192	195	202	213

(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E10

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

	(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
JD 2444080.5		-223	-215	-206	-193	-179	-162	-143	-123	-102	-80	-58	-36	-16	1	15	22	13	-102	143	71	30
1979 JUL 26.0		2889	2945	3003	3061	3121	3181	3241	3300	3359	3416	3471	3524	3575	21	63	98	126	185	58	40	3582
JD 2444070.5		-225	-218	-208	-196	-182	-165	-146	-126	-104	-82	-59	-36	-14	5	24	40	58	-19	22	8	-17
1979 JUL 16.0		2861	2919	2979	3040	3102	3164	3225	3285	3344	3402	3458	3511	3561	6	46	76	92	129	89	43	3577
JD 2444060.5		-226	-220	-211	-199	-185	-168	-149	-128	-106	-83	-59	-35	-11	13	40	82	383	-71	-30	-36	-57
1979 JUL 6.0		2834	2895	2957	3020	3083	3146	3208	3270	3330	3388	3443	3496	3545	3589	23	42	3527	132	87	33	3562
JD 2444050.5		-227	-221	-212	-201	-187	-170	-151	-130	-108	-84	-58	-32	-4	27	74	217	-279	-91	-66	-73	-93
1979 JUN 26.0		2808	2870	2934	2999	3064	3128	3192	3254	3314	3372	3428	3480	3527	3567	3592	3567	226	115	72	14	3539
JD 2444040.5		-227	-222	-214	-203	-189	-172	-153	-132	-109	-83	-56	-27	6	53	155	-258	-183	-109	-97	-107	-126
1979 JUN 16.0		2782	2847	2913	2979	3045	3110	3175	3237	3298	3356	3411	3462	3506	3539	3541	1057	140	93	49	3586	3508
JD 2444030.5		-226	-222	-215	-204	-191	-174	-155	-133	-109	-82	-52	-18	27	108	429	-332	-167	-128	-126	-140	-159
1979 JUN 6.0		2758	2824	2891	2959	3026	3092	3157	3221	3281	3339	3393	3441	3480	3498	3406	203	100	65	19	3550	3470
JD 2444020.5		-226	-222	-215	-205	-192	-175	-156	-133	-108	-79	-45	-2	66	249	-518	-245	-169	-150	-155	-173	-189
1979 MAY 27.0		2734	2801	2870	2939	3007	3074	3140	3203	3264	3321	3373	3417	3446	3425	542	107	66	33	3581	3506	3424
JD 2444010.5		-224	-222	-215	-206	-192	-176	-156	-132	-105	-73	-32	27	152	717	-355	-221	-181	-175	-186	-205	-218
1979 MAY 17.0		2710	2779	2849	2919	2988	3056	3122	3185	3245	3301	3350	3387	3395	3301	137	57	30	3593	3534	3454	3372
JD 2444000.5		-223	-221	-215	-206	-192	-176	-155	-130	-100	-63	-10	85	383	-496	-287	-219	-198	-202	-219	-236	-245
1979 MAY 7.0		2687	2757	2828	2899	2968	3037	3103	3166	3225	3278	3322	3347	3301	285	46	14	3589	3546	3478	3393	3313
JD 2443990.5		-221	-219	-214	-205	-192	-175	-153	-126	-92	-45	31	218	-410	-372	-265	-228	-221	-232	-251	-266	-269
1979 APR 27.0		2665	2736	2807	2879	2949	3017	3084	3146	3203	3253	3289	3287	748	49	3590	3571	3542	3489	3412	3324	3250
JD 2443980.5		-218	-217	-213	-204	-191	-173	-149	-119	-78	-15	115	577	-482	-321	-263	-244	-248	-265	-283	-291	-288
1979 APR 17.0		2643	2714	2787	2858	2929	2998	3063	3125	3180	3224	3244	3232	108	3564	3542	3523	3485	3421	3335	3248	3183
JD 2443970.5		-215	-215	-211	-202	-188	-169	-144	-108	-55	41	317	-567	-391	-304	-271	-266	-278	-297	-311	-312	-303
1979 APR 7.0		2621	2693	2766	2838	2909	2977	3042	3102	3153	3188	3183	373	3544	3505	3491	3466	3417	3339	3248	3167	3114
JD 2443960.5		-212	-212	-208	-199	-185	-164	-134	-91	-15	163	648	-478	-353	-303	-288	-293	-310	-327	-333	-327	-314
1979 MAR 28.0		2600	2672	2745	2817	2888	2956	3020	3077	3122	3142	302	3551	3464	3450	3435	3399	3334	3245	3153	3083	3045
	(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E10

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
JD 2444080.5	217	221	222	222	220	217	212	206	200	192	183	173	163	151	141	134	140	269	-18	28	40
1979 JUL 26.0	650	693	732	766	796	821	841	856	865	868	864	854	837	814	785	754	720	669	691	671	667
JD 2444070.5	215	219	220	220	218	215	211	205	198	190	180	169	156	142	127	109	84	160	94	82	77
1979 JUL 16.0	638	678	715	748	776	800	820	834	844	848	846	839	826	808	787	763	740	707	698	689	689
JD 2444060.5	212	216	217	217	216	213	208	203	195	187	176	163	148	129	104	60	-205	210	140	116	105
1979 JUL 6.0	622	660	695	726	753	776	795	809	819	824	825	820	811	797	781	765	763	710	705	701	704
JD 2444050.5	209	212	214	214	213	210	205	199	192	182	170	155	136	110	65	-70	471	218	164	139	126
1979 JUN 26.0	602	638	671	700	726	748	766	781	791	797	799	797	790	781	771	764	673	710	707	706	710
JD 2444040.5	204	208	210	210	209	206	201	195	187	176	162	144	119	78	-15	540	328	221	178	155	141
1979 JUN 16.0	580	613	644	672	696	718	735	750	760	767	770	770	766	761	757	136	695	702	701	702	708
JD 2444030.5	199	202	204	205	203	200	196	189	180	168	152	129	93	21	-232	500	286	220	186	165	152
1979 JUN 6.0	554	586	615	641	664	685	702	716	726	734	738	740	740	739	735	630	683	686	687	690	697
JD 2444020.5	192	196	198	198	197	194	189	182	172	157	137	107	50	-100	713	366	265	218	190	172	159
1979 MAY 27.0	525	555	583	608	630	649	666	680	691	699	705	709	712	717	190	644	661	664	667	671	679
JD 2444010.5	184	188	190	190	189	186	180	172	161	144	117	72	-29	-381	473	312	250	215	191	175	163
1979 MAY 17.0	494	523	549	572	593	612	628	642	653	662	670	677	685	599	568	623	633	637	641	646	654
JD 2444000.5	175	179	181	181	180	176	170	161	147	125	89	15	-211	616	364	280	237	209	190	175	164
1979 MAY 7.0	461	488	513	535	555	573	589	603	615	625	634	645	653	362	569	592	600	605	610	616	625
JD 2443990.5	165	169	171	171	169	165	158	147	129	100	45	-96	559	429	310	257	225	203	186	173	163
1979 APR 27.0	427	452	475	497	516	533	549	563	575	587	600	617	3481	491	542	557	564	570	575	582	591
JD 2443980.5	154	157	159	159	157	152	144	130	107	65	-30	-355	514	342	275	238	213	194	179	168	159
1979 APR 17.0	391	414	437	457	476	492	508	522	536	550	569	543	360	481	506	518	525	531	537	544	553
JD 2443970.5	141	144	146	146	143	137	126	109	77	10	-191	595	378	291	248	220	200	184	171	161	152
1979 APR 7.0	353	376	397	416	434	451	466	481	497	516	541	59	406	450	467	476	483	490	496	504	512
JD 2443960.5	127	131	132	131	127	120	106	82	34	-91	-380	425	306	255	225	203	186	172	161	151	144
1979 MAR 28.0	315	336	356	375	393	409	425	441	461	489	183	307	387	412	425	433	440	447	453	461	468

(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M14 E10

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
JD 2444080.5 1979 JUL 26.0	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080
JD 2444070.5 1979 JUL 16.0	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115
JD 2444060.5 1979 JUL 6.0	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146
JD 2444050.5 1979 JUN 26.0	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173
JD 2444040.5 1979 JUN 16.0	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198
JD 2444030.5 1979 JUN 6.0	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220
JD 2444020.5 1979 MAY 27.0	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239
JD 2444010.5 1979 MAY 17.0	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257
JD 2444000.5 1979 MAY 7.0	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273
JD 2443990.5 1979 APR 27.0	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287
JD 2443980.5 1979 APR 17.0	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301
JD 2443970.5 1979 APR 7.0	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313
JD 2443960.5 1979 MAR 28.0	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325

(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)

JD2444200.5 1979 NOV 23.0 JD2444240.5 1980 JAN 2.0 JD2444280.5 1980 FEB 11.0 JD2444320.5 1980 MAR 22.0 JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

M14
E10

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
JD 2444080.5	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270
1979 JUL 26.0	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416
JD 2444070.5	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257
1979 JUL 16.0	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389
JD 2444060.5	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244
1979 JUL 6.0	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363
JD 2444050.5	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231
1979 JUN 26.0	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339
JD 2444040.5	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217
1979 JUN 16.0	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315
JD 2444030.5	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204
1979 JUN 6.0	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293
JD 2444020.5	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190
1979 MAY 27.0	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271
JD 2444010.5	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176	176
1979 MAY 17.0	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249
JD 2444000.5	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
1979 MAY 7.0	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228
JD 2443990.5	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148
1979 APR 27.0	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207
JD 2443980.5	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134
1979 APR 17.0	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187
JD 2443970.5	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
1979 APR 7.0	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167
JD 2443960.5	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105
1979 MAR 28.0	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146

(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)
JD2444200.5																					
1979 NOV 23.0																					
JD2444240.5																					
1980 JAN 2.0																					
JD2444280.5																					
1980 FEB 11.0																					
JD2444320.5																					
1980 MAR 22.0																					
JD2444360.5																					
1980 MAY 1.0																					

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E10

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
JD 2444080.5	63	164	265	367	469	571	673	775	876	977	1077	1177	1277	1376	1474	1572	1669	1766	1863	1959	2054
1979 JUL 26.0	1787	1762	1735	1707	1679	1652	1626	1602	1580	1561	1545	1532	1522	1515	1511	1509	1509	1510	1511	1510	1508
JD 2444070.5	118	220	321	423	525	627	728	830	931	1032	1133	1233	1333	1432	1530	1628	1725	1822	1918	2014	2110
1979 JUL 16.0	1771	1743	1714	1685	1656	1628	1601	1576	1554	1534	1516	1502	1491	1482	1476	1473	1471	1471	1470	1469	1466
JD 2444060.5	175	276	378	479	581	683	785	887	988	1089	1190	1290	1389	1488	1586	1684	1781	1878	1975	2071	2167
1979 JUL 6.0	1753	1723	1692	1662	1632	1603	1576	1550	1527	1506	1488	1473	1460	1450	1443	1438	1435	1433	1431	1429	1426
JD 2444050.5	232	334	435	537	639	741	843	944	1046	1147	1247	1347	1447	1546	1644	1742	1839	1936	2032	2128	2224
1979 JUN 26.0	1733	1701	1670	1638	1608	1578	1551	1525	1501	1479	1460	1444	1430	1419	1411	1405	1401	1398	1395	1392	1389
JD 2444040.5	291	392	494	595	697	799	901	1003	1104	1205	1305	1406	1505	1604	1702	1806	1898	1994	2091	2187	2282
1979 JUN 16.0	1711	1678	1646	1614	1583	1553	1525	1498	1474	1452	1432	1415	1401	1389	1380	1375	1368	1364	1360	1357	1353
JD 2444030.5	350	451	553	655	757	858	960	1062	1163	1264	1365	1465	1564	1663	1761	1860	1957	2054	2150	2246	2342
1979 JUN 6.0	1688	1655	1622	1589	1558	1528	1499	1473	1448	1425	1405	1388	1373	1360	1350	1343	1336	1332	1328	1324	1321
JD 2444020.5	410	511	613	715	817	919	1020	1122	1223	1324	1425	1525	1624	1723	1824	1920	2017	2114	2210	2306	2402
1979 MAY 27.0	1665	1631	1597	1565	1533	1503	1474	1447	1422	1399	1379	1361	1345	1332	1322	1314	1307	1302	1298	1294	1291
JD 2444010.5	471	572	674	776	878	979	1081	1183	1284	1385	1486	1586	1685	1781	1883	1981	2078	2175	2271	2367	2463
1979 MAY 17.0	1640	1606	1572	1539	1508	1477	1448	1421	1396	1373	1353	1335	1319	1305	1295	1286	1280	1274	1270	1267	1263
JD 2444000.5	533	634	736	837	939	1041	1143	1244	1346	1447	1547	1647	1746	1848	1945	2042	2140	2236	2333	2429	2524
1979 MAY 7.0	1616	1581	1547	1514	1483	1452	1423	1396	1371	1348	1328	1310	1294	1281	1270	1261	1254	1249	1245	1242	1239
JD 2443990.5	595	696	798	899	1001	1103	1205	1307	1408	1509	1609	1709	1817	1909	2007	2105	2202	2299	2395	2491	2587
1979 APR 27.0	1591	1556	1522	1489	1458	1427	1399	1372	1347	1324	1304	1286	1271	1258	1247	1238	1231	1226	1222	1219	1217
JD 2443980.5	658	759	860	962	1064	1166	1268	1369	1471	1571	1671	1769	1873	1972	2070	2167	2265	2361	2458	2554	2649
1979 APR 17.0	1566	1531	1497	1465	1433	1403	1375	1348	1324	1302	1281	1264	1249	1236	1225	1217	1211	1206	1203	1201	1199
JD 2443970.5	721	822	923	1025	1127	1229	1331	1432	1533	1634	1733	1839	1936	2034	2133	2230	2328	2424	2521	2617	2712
1979 APR 7.0	1541	1507	1473	1440	1409	1380	1352	1326	1302	1280	1260	1243	1229	1216	1206	1199	1193	1189	1186	1185	1185
JD 2443960.5	784	885	987	1089	1190	1292	1394	1495	1597	1697	1783	1900	1999	2098	2196	2294	2391	2488	2584	2680	2776
1979 MAR 28.0	1516	1482	1449	1417	1386	1357	1330	1304	1281	1260	1241	1225	1211	1199	1190	1183	1178	1175	1173	1173	1174

(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)

JD2444200.5	JD2444240.5	JD2444280.5	JD2444320.5	JD2444360.5
1979 NOV 23.0	1980 JAN 2.0	1980 FEB 11.0	1980 MAR 22.0	1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E10

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
JD 2444080.5	131	51	32	24	20	17	15	15	14	14	15	16	18	21	27	37	63	243	131	52	33
1979 JUL 26.0	993	961	909	846	777	707	638	573	512	457	408	365	328	296	270	249	232	220	211	205	202
JD 2444070.5	18	10	7	5	5	4	4	4	4	4	4	4	5	6	8	12	28	96	18	10	7
1979 JUL 16.0	979	937	881	817	749	681	615	553	495	443	397	356	321	291	267	246	231	219	210	205	203
JD 2444060.5	73	47	36	29	26	24	22	22	22	23	25	28	33	42	60	109	679	160	73	48	37
1979 JUL 6.0	960	912	853	788	722	656	592	533	479	430	386	348	315	286	263	244	229	218	210	205	203
JD 2444050.5	102	73	58	50	45	42	40	40	42	44	49	57	69	94	149	396	587	171	102	74	60
1979 JUN 26.0	937	884	824	760	695	631	571	514	463	416	375	339	308	282	260	242	228	217	210	206	204
JD 2444040.5	120	92	77	68	62	59	58	59	62	68	77	92	119	174	344	8777	344	175	120	93	78
1979 JUN 16.0	911	856	794	731	668	607	549	496	447	404	365	331	302	277	256	238	226	216	210	206	206
JD 2444030.5	133	107	93	84	79	76	77	79	85	95	111	138	190	322	1126	731	282	178	133	108	94
1979 JUN 6.0	884	826	765	703	642	584	529	478	432	391	355	323	296	272	253	237	225	216	210	208	208
JD 2444020.5	142	120	107	99	94	93	96	101	111	127	153	202	310	698	2318	450	253	179	142	121	108
1979 MAY 27.0	855	797	736	676	617	561	509	461	418	379	345	315	290	268	249	235	224	216	211	209	211
JD 2444010.5	150	131	119	112	110	111	116	125	140	166	211	301	551	3507	759	354	236	181	150	131	120
1979 MAY 17.0	826	767	708	649	592	539	490	445	404	368	336	308	284	264	246	233	223	216	212	212	214
JD 2444000.5	156	140	131	126	125	129	137	152	176	216	293	475	1331	1526	501	305	224	181	156	141	131
1979 MAY 7.0	796	737	679	623	569	518	471	429	391	356	326	300	278	259	244	232	223	217	214	215	219
JD 2443990.5	162	148	141	139	141	148	162	184	220	286	426	880	5652	738	394	275	216	182	162	149	142
1979 APR 27.0	766	708	652	597	546	498	454	414	378	346	318	294	270	255	241	231	223	218	217	219	224
JD 2443980.5	166	156	152	153	158	170	189	222	279	391	683	2881	1194	515	335	254	209	183	166	157	152
1979 APR 17.0	736	680	625	573	524	478	437	399	365	336	310	288	267	252	239	230	223	220	220	223	231
JD 2443970.5	171	164	163	166	176	193	222	271	362	570	1415	2460	692	408	296	238	204	183	171	164	162
1979 APR 7.0	706	652	599	549	503	460	420	385	354	326	302	280	263	249	238	230	225	223	224	230	239
JD 2443960.5	175	171	173	181	196	221	263	338	493	960	8599	988	503	345	269	226	200	184	175	171	173
1979 MAR 28.0	677	625	574	526	482	442	405	372	343	317	300	275	259	247	237	230	227	227	230	237	250

(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E10

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
JD 2444080.5	-4	-30	-74	-132	-199	-274	-353	-434	-514	-591	-664	-732	-792	-845	-890	-927	-958	-981	-998	-1008	-1014
1979 JUL 26.0	1543	1562	1578	1590	1597	1601	1602	1599	1595	1589	1581	1573	1565	1558	1550	1544	1538	1534	1531	1530	1530
JD 2444070.5	-15	-50	-99	-160	-229	-304	-383	-462	-539	-614	-684	-748	-805	-855	-898	-933	-962	-984	-999	-1009	-1014
1979 JUL 16.0	1559	1578	1592	1602	1608	1610	1609	1606	1600	1593	1585	1577	1568	1560	1552	1545	1540	1535	1532	1531	1531
JD 2444060.5	-31	-73	-127	-190	-261	-336	-413	-490	-565	-637	-703	-764	-818	-866	-906	-939	-966	-987	-1001	-1010	-1014
1979 JUL 6.0	1576	1593	1606	1614	1616	1619	1617	1612	1606	1598	1589	1580	1571	1563	1555	1548	1542	1537	1534	1533	1533
JD 2444050.5	-51	-98	-156	-221	-293	-367	-443	-518	-591	-659	-723	-781	-832	-877	-915	-946	-971	-990	-1003	-1011	1015
1979 JUN 26.0	1594	1609	1620	1626	1629	1628	1625	1619	1612	1603	1594	1584	1575	1566	1558	1551	1545	1540	1537	1536	1537
JD 2444040.5	-74	-125	-186	-253	-325	-399	-473	-546	-616	-682	-743	-797	-846	-888	-923	-955	-976	-993	-1005	-1012	1015
1979 JUN 16.0	1612	1625	1633	1638	1639	1637	1632	1625	1617	1608	1598	1588	1579	1569	1561	1552	1548	1544	1541	1540	1542
JD 2444030.5	-99	-155	-218	-286	-358	-431	-504	-575	-642	-705	-762	-814	-859	-899	-932	-960	-981	-997	-1007	-1013	1014
1979 JUN 6.0	1629	1640	1646	1649	1648	1645	1639	1631	1622	1613	1603	1592	1583	1573	1565	1558	1552	1548	1545	1545	1547
JD 2444020.5	-128	-186	-251	-320	-392	-464	-534	-603	-667	-727	-782	-830	-873	-910	-942	-966	-986	-1000	-1009	1014	1013
1979 MAY 27.0	1646	1655	1659	1660	1658	1653	1646	1637	1628	1618	1607	1597	1587	1577	1568	1562	1556	1553	1551	1551	1554
JD 2444010.5	-158	-219	-285	-355	-425	-496	-565	-630	-692	-749	-801	-847	-887	-920	-950	-973	-990	-1003	-1010	1014	1011
1979 MAY 17.0	1662	1669	1671	1670	1666	1660	1652	1643	1633	1622	1611	1601	1591	1583	1573	1567	1561	1558	1557	1558	1562
JD 2444000.5	-190	-253	-320	-390	-459	-528	-595	-658	-717	-771	-820	-863	-900	-933	-959	-979	-995	-1006	-1011	1013	1008
1979 MAY 7.0	1678	1682	1682	1680	1675	1667	1659	1649	1638	1627	1616	1605	1596	1586	1578	1572	1567	1564	1564	1566	1572
JD 2443990.5	-224	-288	-356	-425	-493	-560	-625	-685	-741	-792	-838	-878	-916	-943	-967	-985	-999	-1008	1012	1011	1004
1979 APR 27.0	1692	1694	1693	1689	1682	1674	1665	1654	1643	1632	1621	1610	1597	1591	1583	1578	1574	1572	1572	1576	1583
JD 2443980.5	-259	-324	-392	-460	-527	-592	-654	-712	-765	-813	-856	-892	-927	-953	-974	-991	-1002	-1009	1011	1007	998
1979 APR 17.0	1706	1706	1703	1697	1690	1681	1670	1659	1648	1636	1626	1616	1604	1596	1589	1584	1581	1580	1582	1587	1596
JD 2443970.5	-295	-361	-428	-495	-561	-624	-683	-738	-788	-833	-873	-910	-938	-963	-982	-996	-1005	1010	1009	1002	990
1979 APR 7.0	1718	1717	1712	1705	1697	1687	1676	1664	1652	1641	1631	1618	1610	1602	1596	1591	1589	1589	1593	1600	1612
JD 2443960.5	-332	-398	-465	-530	-594	-655	-711	-763	-811	-853	-884	-923	-950	-971	-988	-1000	-1006	1009	1005	995	979
1979 MAR 28.0	1730	1727	1721	1713	1703	1693	1681	1670	1658	1647	1642	1625	1616	1609	1603	1600	1598	1600	1606	1615	1631

(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

M14
E10

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
JD 2444080.5	63	67	71	75	80	85	90	95	101	107	113	119	126	133	141	148	156	164	172	180	189
1979 JUL 26.0	86	93	99	105	112	119	126	133	141	148	156	164	172	181	189	198	207	216	225	234	243
JD 2444070.5	67	71	75	79	84	89	94	99	105	111	118	124	131	138	145	153	161	169	177	185	194
1979 JUL 16.0	93	99	105	112	118	125	132	140	147	155	163	171	179	188	196	205	214	223	232	241	250
JD 2444060.5	71	75	79	83	88	93	98	104	110	116	122	129	136	143	150	158	166	174	182	190	199
1979 JUL 6.0	99	105	111	118	125	132	139	146	154	162	170	178	186	195	203	212	221	230	239	248	257
JD 2444050.5	74	78	83	87	92	97	102	108	114	120	127	134	141	148	155	163	171	179	187	195	204
1979 JUN 26.0	105	111	117	124	131	138	145	153	160	168	176	185	193	202	210	219	228	237	246	255	264
JD 2444040.5	78	82	86	91	96	101	107	112	118	125	131	138	145	153	160	168	176	184	192	201	209
1979 JUN 16.0	111	117	124	130	137	144	152	159	167	175	183	191	200	209	217	226	235	244	253	262	271
JD 2444030.5	82	86	90	95	100	105	111	117	123	129	136	143	150	158	165	173	181	189	197	206	215
1979 JUN 6.0	117	123	130	136	143	151	158	166	174	182	190	198	207	215	224	233	242	251	260	269	279
JD 2444020.5	85	89	94	99	104	109	115	121	128	134	141	148	155	163	171	178	186	194	203	211	220
1979 MAY 27.0	123	129	136	143	150	157	165	172	180	188	197	205	214	222	231	240	249	258	267	276	286
JD 2444010.5	89	93	98	103	108	114	119	126	132	139	146	153	160	167	176	183	191	200	208	217	226
1979 MAY 17.0	129	135	142	149	156	163	171	179	187	195	204	212	221	229	238	247	256	265	274	284	293
JD 2444000.5	92	97	102	107	112	118	124	130	137	143	150	158	165	173	181	189	197	205	214	222	231
1979 MAY 7.0	135	141	148	155	162	170	178	186	194	202	210	219	228	237	245	254	263	272	282	291	300
JD 2443990.5	96	100	105	111	116	122	128	135	141	148	155	163	171	178	186	194	202	210	219	228	237
1979 APR 27.0	140	147	154	161	169	176	184	192	200	209	217	226	235	244	252	261	271	280	289	296	307
JD 2443980.5	99	104	109	115	120	126	133	139	146	153	160	167	175	183	191	199	207	216	225	233	243
1979 APR 17.0	146	153	160	168	175	183	191	199	207	215	224	233	242	251	259	269	278	287	296	305	314
JD 2443970.5	103	108	113	119	124	131	137	144	151	158	165	173	180	188	196	204	213	221	230	239	249
1979 APR 7.0	152	159	166	174	181	189	197	205	214	222	231	240	249	258	267	276	285	294	303	312	322
JD 2443960.5	106	112	117	123	129	135	141	148	155	162	169	178	185	193	201	210	218	227	236	245	255
1979 MAR 28.0	156	165	172	180	188	196	204	212	220	229	237	247	256	265	274	283	292	301	310	320	329

(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M14 E10

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
JD 2444080.5 1979 JUL 26.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1485	1401	1332	1276	1232	1205	1176	1159	1152
JD 2444070.5 1979 JUL 16.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1466	1386	1321	1267	1226	1195	1172	1158	1151
JD 2444060.5 1979 JUL 6.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1446	1371	1309	1260	1273	1193	1170	1157	1151
JD 2444050.5 1979 JUN 26.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1509	1426	1356	1299	1268	1253	1189	1168	1156	1152
JD 2444040.5 1979 JUN 16.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1484	1406	1342	1297	1524	1220	1184	1165	1155	1152
JD 2444030.5 1979 JUN 6.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1460	1388	1334	1409	1292	1208	1180	1163	1155	1154
JD 2444020.5 1979 MAY 27.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1516	1437	1374	1359	1524	1244	1199	1175	1161	1155	1156
JD 2444010.5 1979 MAY 17.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1488	1417	1376	1524	1311	1226	1192	1171	1159	1155	1160
JD 2444000.5 1979 MAY 7.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1462	1407	1506	1515	1262	1212	1184	1167	1158	1157	1164
JD 2443990.5 1979 APR 27.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1509	1443	1440	1524	1318	1239	1201	1178	1164	1158	1160	1171
JD 2443980.5 1979 APR 17.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1482	1444	1524	1436	1272	1222	1191	1172	1162	1159	1165	1181
JD 2443970.5 1979 APR 7.0	1524	1524	1524	1524	1524	1524	1524	1524	1523	1467	1524	1524	1318	1246	1208	1183	1167	1161	1162	1173	1194
JD 2443960.5 1979 MAR 28.0	1524	1524	1524	1524	1524	1524	1524	1524	1497	1496	1524	1395	1275	1226	1196	1175	1164	1162	1168	1184	1212

(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)
JD2444200.5 1979 NOV 23.0	JD2444240.5 1980 JAN 2.0			JD2444280.5 1980 FEB 11.0				JD2444320.5 1980 MAR 22.0				JD2444360.5 1980 MAY 1.0								

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E10

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
JD 2444080.5	2327	2020	1738	1478	1237	1015	812	626	459	309	176	61	0	0	0	0	0	0	0	0	0
1979 JUL 26.0	2038	1775	1543	1338	1155	992	849	724	615	523	446	383	332	293	263	241	225	213	221	210	207
JD 2444070.5	2164	1881	1618	1374	1147	938	746	571	412	270	145	36	0	0	0	0	0	0	0	0	0
1979 JUL 16.0	1939	1701	1488	1297	1126	973	838	719	615	527	452	391	342	303	273	251	237	220	215	212	210
JD 2444060.5	2016	1752	1506	1276	1062	864	682	516	366	232	114	10	0	0	0	0	0	0	0	0	0
1979 JUL 6.0	1857	1638	1441	1262	1101	957	829	715	617	532	460	401	353	315	286	268	342	227	221	218	217
JD 2444050.5	1880	1632	1399	1182	980	792	620	463	321	194	83	0	0	0	0	0	0	0	0	0	0
1979 JUN 26.0	1786	1584	1399	1232	1080	943	821	713	619	537	468	411	365	329	304	313	274	238	231	228	227
JD 2444040.5	1752	1518	1298	1092	900	723	559	411	277	157	52	0	0	0	0	2936	0	0	0	0	0
1979 JUN 16.0	1725	1536	1363	1204	1060	931	814	711	621	543	477	422	379	347	338	3008	266	250	243	240	240
JD 2444030.5	1632	1410	1201	1006	824	655	500	360	233	121	22	0	0	0	0	0	0	0	0	0	0
1979 JUN 6.0	1671	1493	1329	1179	1042	919	808	710	624	550	487	435	395	374	515	336	277	264	257	255	256
JD 2444020.5	1518	1307	1108	922	749	589	443	310	191	85	0	0	0	0	244	0	0	0	0	0	0
1979 MAY 27.0	1621	1453	1298	1155	1026	908	803	709	627	556	497	449	418	447	796	318	291	279	273	272	275
JD 2444010.5	1408	1207	1018	841	677	525	387	261	149	50	0	0	0	745	0	0	0	0	0	0	0
1979 MAY 17.0	1575	1416	1269	1133	1009	898	797	708	630	564	509	468	462	1359	391	327	307	296	291	291	296
JD 2444000.5	1303	1111	931	763	607	463	332	214	108	16	0	0	0	0	0	0	0	0	0	0	0
1979 MAY 7.0	1532	1380	1240	1111	994	887	792	708	634	572	523	498	545	600	375	342	325	315	311	313	320
JD 2443990.5	1202	1019	847	687	539	403	279	168	69	0	0	0	1690	0	0	0	0	0	0	0	0
1979 APR 27.0	1491	1346	1213	1090	979	878	787	707	639	582	544	575	2084	445	383	358	344	336	334	338	348
JD 2443980.5	1104	929	766	613	473	344	227	123	33	0	0	519	0	0	0	0	0	0	0	0	0
1979 APR 17.0	1450	1313	1186	1070	964	868	782	707	644	596	586	1181	574	433	397	376	364	358	359	366	380
JD 2443970.5	1010	843	687	542	409	287	178	81	0	0	44	339	0	0	0	0	0	0	0	0	0
1979 APR 7.0	1411	1281	1160	1049	949	858	778	708	652	610	747	979	497	441	413	396	386	383	386	397	416
JD 2443960.5	919	759	611	473	347	233	130	42	0	0	2930	0	0	0	0	0	0	0	0	0	0
1979 MAR 28.0	1373	1249	1134	1029	934	849	774	710	665	686	3186	590	491	453	431	417	410	410	417	432	458

(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

M14
E10

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 600., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
JD 2444080.5	4365	3795	3282	2816	2392	2008	1661	1350	1074	832	622	443	332	293	263	241	225	213	221	210	207
1979 JUL 26.0	63	164	265	367	469	571	673	775	876	977	1077	1177	1277	1376	1474	1572	1669	1766	1863	1959	2054
JD 2444070.5	4103	3582	3106	2671	2274	1912	1584	1289	1027	797	597	427	342	303	273	251	237	220	215	212	210
1979 JUL 16.0	118	220	321	423	525	627	728	830	931	1032	1133	1233	1333	1432	1530	1628	1725	1822	1918	2014	2110
JD 2444060.5	3873	3390	2946	2538	2163	1821	1511	1232	983	764	574	411	353	315	286	268	342	227	221	218	217
1979 JUL 6.0	175	276	378	479	581	683	785	887	988	1089	1190	1290	1389	1488	1586	1684	1781	1878	1975	2071	2167
JD 2444050.5	3666	3216	2799	2414	2060	1735	1441	1176	940	732	551	411	365	329	304	313	274	238	231	228	227
1979 JUN 26.0	232	334	435	537	639	741	843	944	1046	1147	1247	1347	1447	1546	1644	1742	1839	1936	2032	2128	2224
JD 2444040.5	3478	3054	2661	2297	1961	1653	1374	1122	898	700	529	422	379	347	338	5944	266	250	243	240	240
1979 JUN 16.0	291	392	494	595	697	799	901	1003	1104	1205	1305	1406	1505	1604	1702	1806	1898	1994	2091	2187	2282
JD 2444030.5	3303	2903	2531	2185	1866	1574	1309	1070	857	670	508	435	395	374	515	336	277	264	257	255	256
1979 JUN 6.0	350	451	553	655	757	858	960	1062	1163	1264	1365	1465	1564	1663	1761	1860	1957	2054	2150	2246	2342
JD 2444020.5	3139	2760	2406	2078	1775	1497	1245	1019	818	641	497	449	418	447	1041	318	291	279	273	272	275
1979 MAY 27.0	410	511	613	715	817	919	1020	1122	1223	1324	1425	1525	1624	1723	1824	1920	2017	2114	2210	2306	2402
JD 2444010.5	2984	2623	2287	1974	1686	1423	1184	969	779	613	509	468	462	2104	391	327	307	296	291	291	296
1979 MAY 17.0	471	572	674	776	878	979	1081	1183	1284	1385	1486	1586	1685	1781	1883	1981	2078	2175	2271	2367	2463
JD 2444000.5	2835	2492	2172	1874	1601	1351	1124	922	743	588	523	498	645	600	375	342	325	315	311	313	320
1979 MAY 7.0	533	634	736	837	939	1041	1143	1244	1346	1447	1547	1647	1746	1848	1945	2042	2140	2236	2333	2429	2524
JD 2443990.5	2693	2365	2060	1777	1517	1280	1066	875	708	582	544	575	3773	445	383	358	344	336	334	338	348
1979 APR 27.0	595	696	798	899	1001	1103	1205	1307	1408	1509	1609	1709	1817	1909	2007	2105	2202	2299	2395	2491	2587
JD 2443980.5	2555	2243	1952	1683	1436	1212	1010	831	677	596	586	1700	574	433	397	376	364	358	359	366	380
1979 APR 17.0	658	759	860	962	1064	1166	1268	1369	1471	1571	1671	1769	1873	1972	2070	2167	2265	2361	2458	2554	2649
JD 2443970.5	2421	2124	1847	1591	1357	1145	956	789	652	620	791	1318	497	441	413	396	386	383	386	397	416
1979 APR 7.0	721	822	923	1025	1127	1229	1331	1432	1533	1634	1733	1839	1936	2034	2133	2230	2328	2424	2521	2617	2712
JD 2443960.5	2292	2008	1745	1503	1281	1081	904	753	665	686	6116	590	491	453	431	417	410	410	417	432	458
1979 MAR 28.0	784	885	987	1089	1190	1292	1394	1495	1597	1697	1783	1900	1999	2098	2196	2294	2391	2488	2584	2680	2776

(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

M14
E11

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444280.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671752	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.598	DEGREES
MEAN ANOM. AT EPOCH	=	37.632	DEGREES
DATE OF NODAL PASSAGE	=	2444505.380	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444280.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338708	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.404	DEGREES
ARG. OF PERIHELION	=	286.289	DEGREES
MEAN ANOM. AT EPOCH	=	172.637	DEGREES
DATE OF NODAL PASSAGE	=	2444072.523	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.061	DEGREES

EARTH - MARS TRAJECTORY PARAMETERS

M14
E11

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
D 2444080.5	105	104	112	126	145	168	196	228	266	312	370	444	546	690	900	1197	0	1446	1388	1329	1268
979 JUL 26.0	90	90	91	93	98	104	114	128	148	175	212	263	336	441	599	825	0	1040	995	950	905
D 2444070.5	104	105	114	129	149	174	203	238	280	332	397	485	606	784	1044	1385	1471	1414	1356	1297	1236
979 JUL 16.0	92	93	95	98	104	113	125	142	165	196	240	301	389	522	719	982	1073	1028	983	938	893
D 2444060.5	104	106	116	133	155	181	213	251	298	356	432	536	685	907	1224	0	1438	1381	1323	1264	1204
979 JUL 6.0	97	98	101	106	113	123	138	157	184	221	273	348	458	626	869	0	1060	1016	971	925	881
D 2444050.5	105	109	120	138	162	191	225	267	319	386	476	603	790	1069	1430	1461	1405	1348	1290	1231	1171
979 JUN 26.0	103	105	109	115	123	136	153	176	207	252	314	407	548	762	1043	1093	1048	1003	958	913	868
D 2444040.5	106	112	125	145	171	202	240	287	346	424	533	691	929	1270	1482	1427	1371	1314	1256	1197	1138
979 JUN 16.0	111	113	118	125	135	150	170	197	235	288	366	484	666	931	1124	1080	1035	990	945	900	855
D 2444030.5	108	116	131	153	181	216	258	311	380	474	608	809	1113	0	1449	1394	1337	1280	1222	1163	1105
979 JUN 6.0	120	123	128	137	149	166	190	222	268	333	432	585	821	0	1111	1066	1021	976	931	887	843
JD 2444020.5	110	121	139	164	195	233	281	342	423	538	708	970	1338	1468	1414	1359	1303	1245	1188	1129	1071
979 MAY 27.0	129	134	140	151	165	185	213	252	308	391	519	722	1012	1141	1097	1052	1007	962	918	873	829
JD 2444010.5	114	128	148	176	211	254	309	380	479	624	846	1181	0	1434	1380	1324	1268	1210	1153	1095	1037
979 MAY 17.0	140	145	154	166	183	208	241	289	359	467	637	900	0	1127	1082	1038	993	948	903	859	816
JD 2444000.5	120	136	160	191	230	280	343	430	554	742	1034	1429	1453	1399	1345	1289	1232	1175	1118	1061	1004
1979 MAY 7.0	152	159	169	184	204	233	275	334	425	568	796	1111	1155	1112	1067	1022	978	933	889	845	803
JD 2443990.5	127	147	175	210	254	312	388	495	655	904	1274	1471	1418	1364	1309	1253	1197	1140	1083	1026	970
1979 APR 27.0	165	173	186	204	229	264	316	392	512	706	999	1183	1139	1095	1051	1007	962	918	874	831	789
JD 2443980.5	137	161	192	233	284	352	446	582	794	1124	0	1436	1383	1328	1273	1217	1161	1104	1048	992	936
1979 APR 17.0	179	190	205	227	258	302	367	468	631	891	0	1166	1122	1078	1034	990	946	902	859	816	775
JD 2443970.5	149	177	214	260	321	404	522	702	987	1389	1454	1401	1347	1292	1237	1181	1125	1069	1013	957	902
1979 APR 7.0	195	208	227	254	292	348	434	571	794	1115	1191	1148	1105	1061	1017	973	929	886	843	802	761
JD 2443960.5	164	197	240	295	369	472	626	869	1238	1471	1419	1365	1311	1256	1201	1145	1089	1033	978	923	869
1979 MAR 28.0	213	229	252	286	334	408	523	711	1004	1214	1172	1129	1086	1042	998	955	912	869	827	786	747

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

M14
E11

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

	(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD 2444080.5		30	-8	-39	-59	-67	-66	-58	-45	-29	-11	8	27	44	58	65	61	0	-227	-217	-204	-187
1979 JUL 26.0		3582	3514	3456	3420	3410	3419	3442	3476	3516	3560	6	51	93	126	142	134	0	2852	2931	3008	3085
JD 2444070.5		-17	-47	-70	-83	-87	-82	-72	-58	-41	-23	-4	14	29	40	40	30	-232	-227	-219	-206	-190
1979 JUL 16.0		3577	3504	3445	3410	3399	3409	3432	3466	3505	3548	3592	34	70	94	96	70	2756	2835	2915	2993	3070
JD 2444060.5		-57	-81	-99	-107	-106	-99	-87	-72	-54	-36	-17	-0	12	17	11	0	-232	-228	-220	-208	-192
1979 JUL 6.0		3562	3487	3428	3394	3386	3396	3420	3454	3493	3534	3576	14	42	54	37	0	2739	2819	2899	2977	3054
JD 2444050.5		-93	-113	-126	-129	-125	-115	-102	-86	-68	-49	-32	-17	-8	-9	-23	-231	-232	-228	-221	-210	-195
1979 JUN 26.0		3539	3463	3406	3375	3369	3381	3406	3440	3478	3518	3556	3588	7	1	3566	2642	2722	2802	2882	2961	3039
JD 2444040.5		-126	-143	-151	-150	-143	-131	-117	-100	-82	-64	-48	-36	-33	-42	-224	-230	-231	-229	-222	-211	-197
1979 JUN 16.0		3508	3433	3379	3352	3349	3363	3389	3423	3461	3499	3532	3557	3561	3534	2546	2625	2705	2786	2866	2945	3023
JD 2444030.5		-159	-171	-175	-170	-160	-147	-131	-114	-96	-80	-66	-59	-63	0	-221	-228	-230	-229	-223	-213	-199
1979 JUN 6.0		3470	3396	3347	3325	3326	3343	3370	3404	3441	3475	3503	3515	3500	0	2529	2608	2688	2769	2849	2929	3007
JD 2444020.5		-189	-198	-197	-189	-177	-162	-146	-129	-112	-97	-87	-86	-98	-208	-219	-226	-229	-228	-223	-214	-201
1979 MAY 27.0		3424	3355	3312	3295	3300	3320	3349	3383	3417	3447	3465	3461	3422	2434	2512	2591	2671	2752	2833	2912	2991
JD 2444010.5		-218	-222	-217	-206	-193	-177	-160	-144	-128	-116	-112	-119	0	-204	-216	-224	-228	-228	-224	-215	-202
1979 MAY 17.0		3372	3308	3272	3263	3272	3295	3325	3357	3389	3412	3416	3388	0	2417	2495	2574	2654	2735	2816	2896	2974
JD 2444000.5		-245	-244	-235	-222	-207	-191	-175	-159	-146	-138	-141	-154	-184	-200	-213	-222	-227	-227	-224	-216	-203
1979 MAY 7.0		3314	3258	3230	3227	3242	3267	3297	3328	3354	3366	3350	3296	2324	2400	2478	2557	2637	2718	2799	2879	2958
JD 2443990.5		-269	-262	-251	-236	-221	-205	-190	-176	-166	-164	-173	-160	-180	-196	-210	-219	-225	-226	-223	-216	-204
1979 APR 27.0		3250	3204	3186	3190	3209	3236	3266	3294	3311	3306	3262	2234	2308	2383	2461	2540	2620	2700	2781	2862	2941
JD 2443980.5		-288	-278	-264	-249	-233	-218	-204	-193	-188	-192	0	-155	-175	-192	-206	-216	-223	-225	-223	-216	-205
1979 APR 17.0		3183	3148	3140	3151	3173	3202	3230	3251	3255	3224	0	2218	2291	2366	2444	2522	2602	2683	2764	2844	2923
JD 2443970.5		-303	-290	-275	-260	-245	-231	-219	-211	-212	-220	-126	-149	-170	-188	-202	-214	-221	-223	-222	-216	-205
1979 APR 7.0		3114	3092	3093	3110	3135	3163	3187	3198	3180	3118	2130	2202	2275	2350	2426	2505	2585	2665	2746	2827	2906
JD 2443960.5		-314	-299	-284	-269	-256	-243	-234	-231	-236	-95	-120	-143	-165	-183	-199	-210	-218	-222	-221	-215	-204
1979 MAR 28.0		3045	3035	3045	3067	3094	3120	3136	3129	3080	2045	2114	2185	2258	2333	2409	2488	2567	2648	2729	2809	2888
	(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E11

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD 2444080.5	40	49	59	72	87	103	119	135	149	161	171	181	190	201	215	231	0	236	233	230	226
1979 JUL 26.0	667	675	695	726	767	817	872	929	984	1035	1079	1112	1133	1134	1108	1042	0	990	1015	1040	1064
JD 2444070.5	77	78	83	91	103	116	130	143	156	167	178	188	198	210	224	237	240	238	236	233	230
1979 JUL 16.0	689	699	719	748	786	830	879	927	974	1017	1051	1076	1085	1072	1023	929	920	946	970	995	1019
JD 2444060.5	105	101	103	108	117	128	139	151	163	173	184	194	205	218	230	0	239	238	237	235	233
1979 JUL 6.0	704	715	734	761	795	834	876	917	957	991	1017	1032	1028	996	919	0	875	900	924	949	972
JD 2444050.5	126	120	119	122	129	137	147	158	168	178	189	199	211	222	228	238	238	238	237	236	234
1979 JUN 26.0	710	721	740	764	795	828	864	899	931	958	976	979	960	902	797	804	828	853	877	901	925
JD 2444040.5	141	134	132	133	138	145	154	163	173	183	193	203	213	219	233	234	235	236	235	235	234
1979 JUN 16.0	708	719	736	759	785	814	845	874	900	919	927	917	876	788	733	757	781	806	829	853	876
JD 2444030.5	152	144	141	142	145	151	159	167	176	185	194	203	209	0	227	229	231	232	232	232	232
1979 JUN 6.0	697	708	724	744	768	793	819	842	861	872	869	842	772	0	686	710	734	758	781	804	827
JD 2444020.5	159	152	148	148	150	155	162	169	177	185	193	199	196	216	220	222	225	226	228	228	228
1979 MAY 27.0	679	690	705	723	744	765	786	804	817	818	801	749	648	615	639	662	686	709	732	755	777
JD 2444010.5	163	156	152	151	153	157	163	169	176	183	187	186	0	207	211	214	217	220	221	222	223
1979 MAY 17.0	654	665	679	696	713	732	748	761	765	755	718	635	0	569	592	615	638	660	683	705	727
JD 2444000.5	164	157	153	152	154	157	161	166	172	175	174	160	192	197	201	205	208	211	213	215	216
1979 MAY 7.0	625	635	648	663	678	693	705	711	706	679	615	501	499	522	544	567	589	611	633	655	677
JD 2443990.5	163	156	152	151	151	154	157	161	163	162	149	174	179	185	190	194	198	201	204	206	207
1979 APR 27.0	591	601	613	625	638	649	656	654	636	588	491	431	453	475	497	519	541	563	584	605	626
JD 2443980.5	159	153	149	147	147	148	150	151	149	138	0	160	166	171	177	182	186	190	193	195	196
1979 APR 17.0	553	562	573	584	594	601	601	589	553	475	0	386	407	429	450	471	493	514	535	555	576
JD 2443970.5	152	146	142	140	139	139	139	136	125	100	138	145	151	157	163	168	173	177	180	183	184
1979 APR 7.0	512	521	530	539	546	547	540	513	453	342	320	341	362	382	403	424	445	465	486	506	526
JD 2443960.5	144	138	134	131	129	127	122	113	90	114	121	129	135	142	148	153	158	162	166	169	170
1979 MAR 28.0	468	476	484	490	493	488	469	423	330	255	276	296	316	337	357	377	397	417	437	457	476

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)
JD2444400.5																					
1980 JUN 10.0																					
JD2444440.5																					
1980 JUL 20.0																					
JD2444480.5																					
1980 AUG 29.0																					
JD2444520.5																					
1980 OCT 8.0																					
JD2444560.5																					
1980 NOV 17.0																					

EARTH DEPARTURE OR ARRIVAL DATE

M14
E11

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

	(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD 2444080.5 1979 JUL 26.0	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080		0	2080	2080	2080	2080
JD 2444070.5 1979 JUL 16.0	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115
JD 2444060.5 1979 JUL 6.0	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146	2146		0	2146	2146	2146	2146	2146
JD 2444050.5 1979 JUN 26.0	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173	2173
JD 2444040.5 1979 JUN 16.0	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198
JD 2444030.5 1979 JUN 6.0	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220		0	2220	2220	2220	2220	2220	2220	2220	2220
JD 2444020.5 1979 MAY 27.0	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239	2239
JD 2444010.5 1979 MAY 17.0	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257	2257		0	2257	2257	2257	2257	2257	2257	2257	2257	2257
JD 2444000.5 1979 MAY 7.0	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273	2273
JD 2443990.5 1979 APR 27.0	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287	2287
JD 2443980.5 1979 APR 17.0	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301		0	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301	2301
JD 2443970.5 1979 APR 7.0	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313	2313
JD 2443960.5 1979 MAR 28.0	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325	2325

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E11

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD 2444080.5	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	0	270	270	270	270
1979 JUL 26.0	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	0	416	416	416	416
JD 2444070.5	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257
1979 JUL 16.0	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389
JD 2444060.5	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	0	244	244	244	244	244
1979 JUL 6.0	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	0	363	363	363	363	363
JD 2444050.5	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231	231
1979 JUN 26.0	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339	339
JD 2444040.5	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217	217
1979 JUN 16.0	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315
JD 2444030.5	204	204	204	204	204	204	204	204	204	204	204	204	204	0	204	204	204	204	204	204	204
1979 JUN 6.0	293	293	293	293	293	293	293	293	293	293	293	293	293	0	293	293	293	293	293	293	293
JD 2444020.5	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190
1979 MAY 27.0	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271
JD 2444010.5	176	176	176	176	176	176	176	176	176	176	176	176	0	176	176	176	176	176	176	176	176
1979 MAY 17.0	249	249	249	249	249	249	249	249	249	249	249	249	0	249	249	249	249	249	249	249	249
JD 2444000.5	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
1979 MAY 7.0	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228
JD 2443990.5	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148
1979 APR 27.0	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207	207
JD 2443980.5	134	134	134	134	134	134	134	134	134	134	0	134	134	134	134	134	134	134	134	134	134
1979 APR 17.0	187	187	187	187	187	187	187	187	187	187	0	187	187	187	187	187	187	187	187	187	187
JD 2443970.5	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
1979 APR 7.0	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167
JD 2443960.5	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105
1979 MAR 28.0	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)

JD2444400.5
1980 JUN 10.0

JD2444440.5
1980 JUL 20.0

JD2444480.5
1980 AUG 29.0

JD2444520.5
1980 OCT 8.0

JD2444560.5
1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E11

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD 2444080.5	2054	2150	2245	2341	2436	2532	2627	2723	2820	2917	3014	3112	3210	3309	3409	3509	0	111	212	314	416
1979 JUL 26.0	1508	1503	1495	1485	1472	1457	1440	1423	1406	1391	1379	1376	1386	1419	1492	1626	0	1755	1713	1672	1630
JD 2444070.5	2110	2206	2301	2396	2492	2587	2683	2779	2875	2972	3070	3167	3266	3365	3465	3565	65	166	268	369	471
1979 JUL 16.0	1466	1461	1454	1444	1433	1419	1404	1389	1375	1364	1358	1363	1386	1441	1549	1726	1773	1732	1690	1648	1607
JD 2444060.5	2167	2262	2357	2453	2548	2644	2739	2835	2932	3029	3126	3224	3322	3421	3521	0	122	223	324	426	528
1979 JUL 6.0	1426	1421	1414	1406	1395	1383	1370	1358	1348	1341	1343	1358	1398	1483	1635	0	1750	1708	1666	1624	1582
JD 2444050.5	2224	2320	2415	2510	2606	2701	2797	2893	2989	3086	3184	3282	3380	3479	3578	79	179	280	382	483	585
1979 JUN 26.0	1389	1384	1377	1370	1360	1350	1340	1330	1324	1323	1334	1363	1428	1552	1750	1767	1725	1683	1641	1599	1557
JD 2444040.5	2282	2378	2473	2569	2664	2760	2855	2951	3048	3145	3242	3340	3438	3537	37	137	238	339	440	542	644
1979 JUN 16.0	1353	1349	1343	1336	1328	1320	1312	1306	1305	1311	1333	1383	1481	1655	1784	1743	1700	1658	1616	1574	1532
JD 2444030.5	2342	2437	2533	2628	2723	2819	2915	3011	3107	3204	3301	3399	3497	0	97	197	297	398	499	601	703
1979 JUN 6.0	1321	1316	1311	1305	1299	1293	1288	1286	1291	1307	1345	1423	1568	0	1759	1717	1675	1633	1590	1548	1506
JD 2444020.5	2402	2497	2593	2688	2783	2879	2975	3071	3167	3264	3361	3459	3557	58	157	257	357	458	560	661	763
1979 MAY 27.0	1291	1287	1282	1277	1273	1269	1268	1271	1284	1314	1374	1492	1691	1776	1734	1691	1649	1607	1564	1522	1480
JD 2444010.5	2463	2558	2654	2749	2844	2940	3036	3132	3228	3325	3422	3520	0	118	218	318	418	519	621	722	824
1979 MAY 17.0	1263	1260	1256	1253	1250	1250	1253	1263	1287	1335	1428	1599	0	1750	1708	1665	1623	1580	1538	1496	1453
JD 2444000.5	2524	2620	2715	2811	2906	3001	3097	3193	3290	3386	3483	3578	81	180	279	379	480	581	682	784	886
1979 MAY 7.0	1239	1236	1234	1232	1232	1235	1244	1263	1301	1376	1517	1740	1765	1723	1681	1638	1596	1553	1511	1469	1427
JD 2443990.5	2587	2682	2777	2873	2968	3064	3159	3255	3352	3448	3544	46	143	242	341	441	542	643	744	846	948
1979 APR 27.0	1217	1216	1215	1215	1218	1226	1242	1274	1334	1448	1649	1780	1739	1696	1654	1611	1569	1526	1484	1442	1400
JD 2443980.5	2649	2745	2840	2935	3031	3126	3222	3318	3414	3510	0	108	206	305	404	504	605	706	807	909	1010
1979 APR 17.0	1199	1199	1200	1203	1210	1224	1250	1299	1391	1561	0	1754	1712	1669	1627	1584	1542	1499	1457	1415	1373
JD 2443970.5	2712	2808	2903	2999	3094	3189	3285	3381	3477	3570	74	171	269	368	467	567	668	769	870	972	1074
1979 APR 7.0	1185	1186	1189	1196	1208	1230	1270	1345	1486	1712	1768	1726	1684	1642	1599	1557	1515	1472	1430	1388	1347
JD 2443960.5	2776	2871	2967	3062	3157	3253	3348	3444	3539	42	136	234	332	431	530	631	731	832	933	1035	1137
1979 MAR 28.0	1174	1177	1183	1194	1213	1247	1308	1423	1624	1782	1741	1699	1657	1614	1572	1530	1487	1445	1403	1362	1320

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E11

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

	(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD 2444080.5		33	25	20	18	16	15	14	14	15	15	17	19	23	29	44	90	0	74	39	27	22
1979 JUL 26.0		202	203	206	211	220	232	247	267	293	327	371	430	511	623	772	931	0	996	987	972	953
JD 2444070.5		7	6	5	4	4	4	4	4	4	4	5	5	7	9	16	59	32	13	8	6	5
1979 JUL 16.0		203	203	207	213	223	236	253	275	304	343	394	463	560	693	858	988	999	992	980	962	941
JD 2444060.5		37	30	26	24	23	22	22	23	24	26	30	36	47	71	159	0	104	58	41	32	27
1979 JUL 6.0		203	205	209	216	226	241	260	285	318	362	422	505	621	777	942	0	996	986	971	952	928
JD 2444050.5		60	51	46	42	41	40	41	43	46	51	60	76	107	192	1062	293	130	85	65	54	47
1979 JUN 26.0		204	206	211	219	231	247	269	298	336	387	458	558	698	871	995	998	991	978	961	940	915
JD 2444040.5		78	69	63	60	58	59	61	64	71	82	100	133	210	534	897	246	145	105	84	72	65
1979 JUN 16.0		206	209	214	224	237	256	280	313	357	418	504	626	791	958	1000	995	984	969	950	927	901
JD 2444030.5		94	85	80	77	76	78	82	89	100	119	153	222	428	0	455	227	154	119	100	88	81
1979 JUN 6.0		208	212	219	229	245	266	294	332	385	458	563	712	894	0	997	989	976	959	937	913	885
JD 2444020.5		108	100	95	93	94	98	105	117	136	169	231	384	1250	935	346	216	160	130	113	102	96
1979 MAY 27.0		211	215	224	236	254	278	311	356	419	510	640	817	978	999	993	982	967	947	924	898	870
JD 2444010.5		120	113	110	110	113	120	132	151	182	238	360	787	0	537	296	209	165	140	124	115	111
1979 MAY 17.0		214	220	230	245	266	294	333	387	465	577	738	925	0	996	987	974	956	934	910	882	853
JD 2444000.5		131	126	125	128	134	145	163	192	243	344	620	3466	889	406	267	204	169	147	135	128	125
1979 MAY 7.0		219	226	238	256	280	314	360	427	524	666	854	994	998	991	980	964	944	920	894	866	836
JD 2443990.5		142	139	140	146	156	173	200	246	332	532	1453	1754	564	340	248	200	172	154	145	140	140
1979 APR 27.0		224	234	248	269	298	338	396	479	602	777	959	999	994	985	970	952	930	905	878	849	819
JD 2443980.5		152	152	156	165	181	206	247	321	476	977	0	813	432	299	234	197	174	161	154	152	155
1979 APR 17.0		231	243	260	285	321	370	442	548	705	900	0	997	989	976	960	939	916	890	862	832	802
JD 2443970.5		162	165	173	187	210	247	311	435	763	3265	1275	554	359	271	223	194	177	167	163	164	170
1979 APR 7.0		239	254	276	306	349	412	503	640	829	987	999	992	981	966	947	925	900	873	844	814	784
JD 2443960.5		173	179	192	212	245	300	402	637	1624	2427	728	432	313	251	214	192	179	172	171	176	187
1979 MAR 28.0		250	268	295	333	387	466	584	757	947	1000	995	986	972	955	934	910	884	856	827	797	766
	(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)

JD2444400.5
1980 JUN 10.0

JD2444440.5
1980 JUL 20.0

JD2444480.5
1980 AUG 29.0

JD2444520.5
1980 OCT 8.0

JD2444560.5
1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E11

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD 2444080.5	-1014	1015	1011	1003	990	973	950	922	886	841	783	707	605	466	282	85	0	-4	-17	-38	-66
1979 JUL 26.0	1530	1531	1535	1540	1548	1560	1575	1595	1622	1658	1707	1775	1870	2005	2188	2395	0	2724	2746	2763	2775
JD 2444070.5	-1014	1015	1010	1001	987	969	944	913	874	823	756	668	547	381	177	15	-1	-10	-27	-52	-84
1979 JUL 16.0	1531	1533	1537	1544	1553	1566	1583	1607	1638	1681	1739	1820	1936	2099	2309	2487	2724	2748	2767	2781	2791
JD 2444060.5	-1014	1014	1009	999	983	963	936	902	858	800	723	618	473	278	73	0	-5	-19	-40	-68	-103
1979 JUL 6.0	1533	1536	1541	1548	1559	1574	1594	1622	1658	1709	1778	1877	2019	2214	2431	0	2749	2770	2787	2798	2805
JD 2444050.5	1015	1013	1007	995	979	956	926	888	837	771	680	553	378	161	6	-1	-12	-30	-55	-86	-124
1979 JUN 26.0	1537	1540	1546	1555	1567	1585	1608	1640	1683	1743	1828	1950	2124	2347	2521	2749	2773	2791	2805	2814	2818
JD 2444040.5	1015	1012	1004	991	972	947	914	870	812	733	624	470	263	53	-0	-6	-21	-43	-72	-107	-147
1979 JUN 16.0	1542	1546	1552	1563	1577	1597	1625	1662	1714	1787	1891	2042	2252	2474	2748	2774	2794	2810	2821	2827	2830
JD 2444030.5	1014	1010	1000	985	964	936	898	847	779	685	551	363	134	0	-3	-14	-33	-58	-91	-128	-172
1979 JUN 6.0	1547	1552	1560	1572	1589	1613	1645	1690	1753	1842	1972	2160	2397	0	2774	2797	2815	2828	2836	2840	2840
JD 2444020.5	1013	1007	996	978	954	922	878	818	737	621	456	233	29	-0	-9	-24	-47	-76	-112	-152	-198
1979 MAY 27.0	1554	1560	1570	1584	1604	1632	1671	1725	1801	1913	2077	2304	2524	2774	2799	2819	2833	2844	2849	2851	2849
JD 2444010.5	1011	1003	989	969	941	903	852	781	681	537	333	96	0	-4	-17	-37	-63	-96	-134	-178	-225
1979 MAY 17.0	1562	1570	1581	1598	1622	1656	1702	1768	1864	2005	2211	2458	0	2800	2822	2838	2851	2858	2861	2861	2856
JD 2444000.5	1008	998	981	958	925	880	819	732	608	427	187	8	-2	-11	-28	-52	-82	-118	-159	-205	-254
1979 MAY 7.0	1572	1581	1595	1616	1644	1685	1742	1824	1945	2126	2372	2570	2801	2824	2843	2857	2866	2871	2872	2869	2863
JD 2443990.5	1004	991	971	943	904	851	775	668	510	286	53	-0	-7	-21	-42	-70	-103	-142	-186	-233	-284
1979 APR 27.0	1583	1595	1612	1637	1672	1721	1792	1896	2053	2280	2527	2801	2826	2847	2862	2873	2880	2883	2881	2876	2868
JD 2443980.5	998	982	958	924	877	812	718	581	380	129	0	-3	-15	-33	-58	-90	-126	-168	-214	-263	-315
1979 APR 17.0	1596	1611	1632	1662	1705	1767	1857	1992	2194	2454	0	2828	2850	2868	2880	2889	2893	2893	2889	2882	2872
JD 2443970.5	990	969	940	900	842	761	642	465	222	17	-1	-10	-26	-48	-77	-112	-151	-195	-243	-294	-347
1979 APR 7.0	1612	1630	1656	1694	1747	1825	1942	2118	2367	2589	2829	2853	2872	2887	2897	2902	2904	2902	2896	2887	2876
JD 2443960.5	979	954	918	868	796	693	539	316	6?	-0	-6	-19	-40	-66	-98	-136	-178	-224	-274	-326	-380
1979 MAR 28.0	1631	1653	1686	1733	1801	1901	2054	2280	2540	2830	2856	2876	2893	2904	2911	2914	2914	2909	2902	2891	2878

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

M14
E11

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD 2444080.5	189	197	206	215	225	235	245	256	267	280	295	314	341	386	489	877	0	112	113	114	116
1979 JUL 26.0	243	252	262	271	280	290	299	309	318	328	337	347	356	364	372	379	0	227	230	234	237
JD 2444070.5	194	202	211	221	230	240	250	261	273	287	303	325	359	425	614	2102	112	113	114	116	118
1979 JUL 16.0	250	259	269	278	287	297	306	316	325	335	344	353	362	371	378	383	227	230	233	237	241
JD 2444060.5	199	208	217	226	235	245	256	267	280	294	313	339	385	494	949	0	113	114	116	117	119
1979 JUL 6.0	257	266	276	285	294	304	313	323	332	342	351	360	369	377	383	0	230	233	237	241	245
JD 2444050.5	204	213	222	231	241	251	262	273	287	303	324	359	428	642	3218	113	114	116	117	119	121
1979 JUN 26.0	264	274	283	292	302	311	320	330	339	348	358	367	375	382	387	230	233	237	241	245	249
JD 2444040.5	209	218	227	237	246	257	268	280	295	313	340	368	509	1114	113	114	115	117	119	121	123
1979 JUN 16.0	271	281	290	299	309	318	327	337	346	355	364	373	381	387	230	233	237	240	244	249	253
JD 2444030.5	215	224	233	242	252	263	274	288	304	325	361	437	704	0	114	115	117	118	120	123	125
1979 JUN 6.0	279	288	297	306	316	325	334	344	353	362	371	379	386	0	233	237	240	244	248	253	257
JD 2444020.5	220	229	238	248	258	269	281	296	314	342	394	540	1517	114	115	117	118	120	122	124	127
1979 MAY 27.0	286	295	304	314	323	332	342	351	360	369	378	385	391	233	237	240	244	248	252	257	261
JD 2444010.5	226	235	244	254	264	276	289	305	328	366	456	830	0	115	116	118	120	122	124	126	129
1979 MAY 17.0	293	302	311	321	330	339	349	358	367	376	384	390	0	236	240	243	247	251	256	261	266
JD 2444000.5	231	240	250	260	271	283	298	317	347	408	600	2813	115	116	118	119	121	123	126	128	131
1979 MAY 7.0	300	309	319	328	337	347	356	365	374	382	389	394	236	240	243	247	251	255	260	265	270
JD 2443990.5	237	246	256	266	278	291	308	332	376	491	1120	115	116	117	119	121	123	125	128	130	134
1979 APR 27.0	307	317	326	335	344	354	363	372	380	388	394	236	239	243	246	250	255	259	264	269	275
JD 2443980.5	243	252	262	273	286	301	321	355	430	718	0	116	117	118	120	122	124	127	129	133	136
1979 APR 17.0	314	324	333	342	351	361	370	378	387	393	0	239	243	246	250	254	258	263	268	273	279
JD 2443970.5	249	258	269	281	294	312	339	393	554	1959	116	117	118	120	121	124	126	129	132	135	138
1979 APR 7.0	322	331	340	349	359	368	377	385	392	397	239	242	246	249	253	258	262	267	272	278	284
JD 2443960.5	255	265	276	289	305	327	368	469	982	116	117	118	119	121	123	125	128	131	134	137	141
1979 MAR 28.0	329	338	347	356	366	375	383	391	397	239	242	245	249	253	257	261	266	271	277	282	288

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE — EARTH - MARS TRAJECTORY PARAMETERS — M14 E11

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD 2444080.5 1979 JUL 26.0	1152	1151	1157	1170	1189	1216	1252	1300	1362	1446	1524	1524	1524	1524	1524	1524	0	1524	1524	1524	1524
JD 2444070.5 1979 JUL 16.0	1151	1152	1159	1173	1194	1223	1263	1316	1387	1485	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444060.5 1979 JUL 6.0	1151	1153	1161	1177	1200	1233	1277	1337	1419	1524	1524	1524	1524	1524	1524	0	1524	1524	1524	1524	1524
JD 2444050.5 1979 JUN 26.0	1152	1155	1165	1182	1209	1245	1296	1365	1460	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444040.5 1979 JUN 16.0	1152	1157	1169	1190	1219	1261	1319	1400	1514	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444030.5 1979 JUN 6.0	1154	1161	1175	1199	1233	1281	1349	1445	1524	1524	1524	1524	1524	0	1524	1524	1524	1524	1524	1524	1524
JD 2444020.5 1979 MAY 27.0	1156	1165	1183	1211	1251	1308	1388	1505	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444010.5 1979 MAY 17.0	1160	1172	1193	1226	1274	1342	1440	1524	1524	1524	1524	1524	0	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444000.5 1979 MAY 7.0	1164	1180	1207	1246	1304	1386	1508	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2443990.5 1979 APR 27.0	1171	1192	1224	1272	1343	1446	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2443980.5 1979 APR 17.0	1181	1207	1247	1307	1395	1524	1524	1524	1524	1524	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2443970.5 1979 APR 7.0	1194	1227	1278	1353	1465	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2443960.5 1979 MAR 28.0	1212	1255	1319	1415	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)

JD2444400.5 1980 JUN 10.0 — JD2444440.5 1980 JUL 20.0 — JD2444480.5 1980 AUG 29.0 — JD2444520.5 1980 OCT 8.0 — JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E11

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD 2444080.5	0	0	0	0	0	0	0	0	0	0	38	203	444	810	1377	2209	0	2924	2757	2586	2413
1979 JUL 26.0	207	206	207	211	218	229	247	273	312	370	456	584	776	1070	1520	2177	0	2809	2678	2545	2413
JD 2444070.5	0	0	0	0	0	0	0	0	0	0	97	296	595	1060	1777	2747	2995	2831	2664	2494	2321
1979 JUL 16.0	210	211	214	220	229	244	266	299	348	419	525	683	924	1298	1869	2638	2905	2774	2642	2509	2377
JD 2444060.5	0	0	0	0	0	0	0	0	0	10	174	419	799	1397	2285	0	2901	2737	2569	2400	2229
1979 JUL 6.0	217	219	223	231	244	263	291	332	391	480	611	809	1117	1598	2307	0	2870	2738	2605	2472	2341
JD 2444050.5	0	0	0	0	0	0	0	0	0	73	275	585	1077	1847	2877	2966	2805	2641	2474	2305	2135
1979 JUN 26.0	227	230	236	247	263	287	321	372	446	555	719	973	1372	1992	2819	2964	2833	2700	2568	2435	2304
JD 2444040.5	0	0	0	0	0	0	0	0	0	157	412	813	1458	2417	3027	2870	2708	2544	2378	2210	2042
1979 JUN 16.0	240	245	253	266	286	316	359	421	513	650	859	1189	1714	2488	3057	2927	2795	2662	2529	2397	2267
JD 2444030.5	0	0	0	0	0	0	0	0	60	270	598	1130	1971	0	2930	2772	2610	2446	2280	2114	1948
1979 JUN 6.0	256	262	273	290	315	351	404	482	597	771	1043	1480	2166	0	3018	2887	2755	2622	2490	2358	2229
JD 2444020.5	0	0	0	0	0	0	0	0	155	424	859	1571	2613	2988	2832	2673	2511	2347	2183	2018	1853
1979 MAY 27.0	275	283	296	317	349	394	460	557	703	929	1291	1876	2726	3108	2978	2846	2714	2581	2449	2319	2191
JD 2444010.5	0	0	0	0	0	0	0	61	284	640	1230	2164	0	2889	2732	2573	2411	2248	2084	1921	1759
1979 MAY 17.0	296	307	324	351	389	446	529	652	841	1141	1630	2398	0	3065	2935	2803	2671	2539	2408	2279	2152
JD 2444000.5	0	0	0	0	0	0	0	170	463	948	1749	2874	2943	2789	2631	2471	2310	2148	1986	1824	1664
1979 MAY 7.0	320	334	357	390	438	509	614	774	1023	1430	2094	3018	3150	3020	2890	2758	2626	2495	2365	2237	2112
JD 2443990.5	0	0	0	0	0	0	77	321	719	1389	2430	2995	2843	2687	2529	2370	2209	2048	1887	1727	1570
1979 APR 27.0	348	367	395	437	498	588	723	933	1271	1831	2690	3230	3103	2973	2842	2711	2580	2450	2322	2195	2072
JD 2443980.5	0	0	0	0	0	2	205	534	1089	2002	0	2895	2741	2585	2427	2267	2107	1947	1788	1631	1476
1979 APR 17.0	380	404	440	493	570	686	863	1146	1613	2372	0	3181	3053	2923	2792	2662	2532	2403	2277	2153	2032
JD 2443970.5	0	0	0	0	0	112	386	844	1619	2759	2946	2794	2639	2482	2323	2165	2006	1847	1690	1535	1383
1979 APR 7.0	416	447	493	560	660	811	1049	1439	2087	3029	3255	3128	3000	2870	2741	2611	2483	2356	2231	2109	1990
JD 2443960.5	0	0	0	0	36	266	646	1293	2327	2996	2845	2691	2535	2378	2220	2062	1904	1747	1592	1440	1290
1979 MAR 28.0	458	498	556	643	773	975	1301	1846	2704	3324	3199	3073	2944	2816	2687	2559	2432	2307	2184	2065	1949

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M14
E11

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD 2444080.5	207	206	207	211	218	229	247	273	312	370	494	787	1220	1880	2897	4386	0	5734	5435	5132	4826
1979 JUL 26.0	2054	2150	2245	2341	2436	2532	2627	2723	2820	2917	3014	3112	3210	3309	3409	3509	0	111	212	314	416
JD 2444070.5	210	211	214	220	229	244	266	299	348	419	622	979	1520	2358	3646	5385	5900	5605	5306	5003	4698
1979 JUL 16.0	2110	2206	2301	2396	2492	2587	2683	2779	2875	2972	3070	3167	3266	3365	3465	3565	65	166	268	369	471
JD 2444060.5	217	219	223	231	244	263	291	332	391	489	785	1229	1916	2995	4592	0	5771	5475	5174	4872	4569
1979 JUL 6.0	2167	2262	2357	2453	2548	2644	2739	2835	2932	3029	3126	3224	3322	3421	3521	0	122	223	324	426	528
JD 2444050.5	227	230	236	247	263	287	321	372	446	628	995	1558	2449	3839	5695	5931	5638	5341	5042	4740	4439
1979 JUN 26.0	2224	2320	2415	2510	2606	2701	2797	2893	2989	3086	3184	3282	3380	3479	3578	79	179	280	382	483	585
JD 2444040.5	240	245	253	266	286	316	359	421	513	807	1271	2002	3172	4905	6085	5797	5503	5206	4907	4607	4308
1979 JUN 16.0	2282	2378	2473	2569	2664	2760	2855	2951	3048	3145	3242	3340	3438	3537	37	137	238	339	440	542	644
JD 2444030.5	256	262	273	290	315	351	404	482	657	1041	1641	2610	4137	0	5949	5659	5365	5068	4770	4472	4176
1979 JUN 6.0	2342	2437	2533	2628	2723	2819	2915	3011	3107	3204	3301	3399	3497	0	97	197	297	398	499	601	703
JD 2444020.5	275	283	296	317	349	394	460	557	858	1354	2150	3447	5339	6095	5810	5519	5225	4928	4632	4336	4044
1979 MAY 27.0	2402	2497	2593	2688	2783	2879	2975	3071	3167	3264	3361	3459	3557	58	157	257	357	458	560	661	763
JD 2444010.5	296	307	324	351	389	446	529	713	1125	1781	2860	4561	0	5954	5667	5376	5082	4787	4492	4199	3910
1979 MAY 17.0	2463	2558	2654	2749	2844	2940	3036	3132	3228	3325	3422	3520	0	118	218	318	418	519	621	722	824
JD 2444000.5	320	334	357	390	438	509	614	943	1487	2378	3843	5892	6093	5809	5521	5229	4936	4643	4351	4061	3776
1979 MAY 7.0	2524	2620	2715	2811	2906	3001	3097	3193	3290	3386	3483	3578	81	180	279	379	480	581	682	784	886
JD 2443990.5	348	367	395	437	498	588	800	1253	1990	3220	5120	6226	5945	5660	5371	5080	4789	4498	4208	3923	3642
1979 APR 27.0	2587	2682	2777	2873	2968	3064	3159	3255	3352	3448	3544	46	143	242	341	441	542	643	744	846	948
JD 2443980.5	380	404	440	493	570	688	1069	1681	2702	4374	0	6076	5794	5508	5219	4929	4639	4351	4065	3784	3508
1979 APR 17.0	2649	2745	2840	2935	3031	3126	3222	3318	3414	3510	0	108	206	305	404	504	605	706	807	909	1010
JD 2443970.5	416	447	493	560	660	924	1435	2283	3706	5788	6201	5922	5638	5352	5064	4776	4488	4203	3921	3644	3373
1979 APR 7.0	2712	2808	2903	2999	3094	3189	3285	3381	3477	3570	74	171	269	368	467	567	668	769	870	972	1074
JD 2443960.5	458	498	556	643	810	1241	1946	3138	5031	6321	6044	5764	5480	5194	4907	4621	4336	4054	3777	3505	3239
1979 MAR 28.0	2776	2671	2967	3062	3157	3253	3348	3444	3539	42	136	234	332	431	530	631	731	832	933	1035	1137

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

M15
E06

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2443800.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671807	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.576	DEGREES
MEAN ANOM. AT EPOCH	=	284.544	DEGREES
DATE OF NODAL PASSAGE	=	2443774.886	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2443800.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338585	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.394	DEGREES
ARG. OF PERIHELION	=	286.275	DEGREES
MEAN ANOM. AT EPOCH	=	281.108	DEGREES
DATE OF NODAL PASSAGE	=	2443385.558	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.056	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E06

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)
JD 2444200.5	0	0	0	0	0	0	0	0	0	0	1440	1497	0	1335	1051	823	652	524	427	350	289
1979 NOV 23.0	0	0	0	0	0	0	0	0	0	0	1053	1089	0	973	794	652	551	478	427	390	364
JD 2444190.5	0	0	0	0	0	0	0	0	0	1407	1466	1523	1496	1196	934	733	584	472	385	317	262
1979 NOV 13.0	0	0	0	0	0	0	0	0	0	1041	1077	1113	1085	893	727	604	517	456	412	380	358
JD 2444180.5	0	0	0	0	0	0	0	0	1374	1434	1492	1549	1353	1061	827	653	523	424	347	286	238
1979 NOV 3.0	0	0	0	0	0	0	0	0	1029	1066	1102	1137	1002	815	668	563	488	436	398	371	352
JD 2444170.5	0	0	0	0	0	0	0	1341	1401	1461	1518	1514	1206	937	732	581	468	381	313	258	216
1979 OCT 24.0	0	0	0	0	0	0	0	1018	1054	1091	1126	1115	916	744	616	527	463	419	387	364	348
JD 2444160.5	0	0	0	0	0	0	1308	1369	1429	1488	1545	1364	1064	824	647	516	418	341	281	233	197
1979 OCT 14.0	0	0	0	0	0	0	1007	1043	1080	1116	1152	1027	833	680	571	495	442	404	377	358	345
JD 2444150.5	0	0	0	0	0	1275	1336	1397	1456	1515	1523	1208	932	723	572	459	373	305	252	210	181
1979 OCT 4.0	0	0	0	0	0	995	1032	1069	1106	1142	1142	935	756	624	532	468	423	391	368	353	342
JD 2444140.5	0	0	0	0	1242	1304	1365	1425	1484	1542	1365	1057	813	635	505	407	332	272	226	191	168
1979 SEP 24.0	0	0	0	0	984	1021	1058	1095	1132	1168	1047	844	686	575	498	445	407	380	361	348	341
JD 2444130.5	0	0	0	1210	1272	1333	1394	1454	1512	1524	1199	917	707	556	445	361	295	243	203	174	159
1979 SEP 14.0	0	0	0	973	1010	1048	1085	1122	1159	1163	946	760	626	533	469	424	392	370	355	345	340
JD 2444120.5	0	0	1179	1240	1302	1362	1423	1482	0	1354	1038	792	615	488	392	319	261	216	183	162	153
1979 SEP 4.0	0	0	963	1000	1037	1074	1112	1149	0	1059	848	686	574	497	444	406	380	362	350	343	339
JD 2444110.5	0	1148	1209	1270	1332	1392	1452	1511	0	1177	891	683	535	427	345	281	231	193	167	153	152
1979 AUG 25.0	0	952	989	1026	1064	1102	1139	1176	0	949	757	621	529	465	422	391	369	355	346	341	340
JD 2444100.5	1118	1179	1240	1301	1362	1422	1481	0	1329	1007	762	589	465	373	303	247	205	174	155	149	156
1979 AUG 15.0	941	978	1015	1053	1091	1129	1167	0	1061	841	677	565	490	438	402	377	360	349	342	340	341
JD 2444090.5	1150	1210	1271	1332	1392	1452	1511	1486	1140	854	651	508	404	326	265	218	182	158	147	149	163
1979 AUG 5.0	967	1004	1042	1081	1119	1157	1194	1179	939	744	609	518	457	415	385	365	352	344	340	339	342
JD 2444080.5	1181	1242	1302	1363	1423	1482	0	1288	962	722	556	438	351	284	232	192	164	148	145	154	173
1979 JUL 26.0	993	1031	1070	1108	1146	1185	0	1049	823	659	551	478	428	394	371	355	345	339	338	339	344

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E06

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

	(FLT T)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)
JD 2444200.5		0	0	0	0	0	0	0	0	0	0	200	215	0	-131	-138	-140	-136	-131	-126	-125	-131
1979 NOV 23.0		0	0	0	0	0	0	0	0	0	0	541	620	0	3361	3352	3358	3378	3403	3429	3451	3464
JD 2444190.5		0	0	0	0	0	0	0	0	0	177	196	213	-140	-151	-155	-154	-150	-145	-141	-143	-152
1979 NOV 13.0		0	0	0	0	0	0	0	0	0	452	529	607	3326	3309	3307	3320	3344	3370	3395	3414	3420
JD 2444180.5		0	0	0	0	0	0	0	0	151	173	193	210	-161	-169	-170	-167	-162	-158	-157	-161	-174
1979 NOV 3.0		0	0	0	0	0	0	0	0	366	440	516	594	3271	3259	3264	3283	3309	3336	3359	3372	3371
JD 2444170.5		0	0	0	0	0	0	0	122	146	169	190	-169	-179	-184	-184	-180	-175	-172	-173	-181	-198
1979 OCT 24.0		0	0	0	0	0	0	0	281	354	428	504	3236	3216	3211	3223	3246	3274	3300	3319	3325	3313
JD 2444160.5		0	0	0	0	0	0	90	117	142	165	186	-187	-195	-198	-195	-191	-187	-186	-189	-201	-223
1979 OCT 14.0		0	0	0	0	0	0	199	269	341	415	491	3176	3161	3164	3183	3209	3237	3260	3274	3271	3246
JD 2444150.5		0	0	0	0	0	56	84	111	137	161	-194	-204	-209	-209	-206	-202	-199	-200	-207	-222	-247
1979 OCT 4.0		0	0	0	0	0	118	187	257	329	403	3140	3115	3108	3119	3142	3170	3197	3216	3222	3208	3167
JD 2444140.5		0	0	0	0	22	51	79	106	132	156	-210	-218	-220	-218	-215	-211	-210	-214	-224	-243	-270
1979 SEP 24.0		0	0	0	0	38	106	175	245	317	390	3075	3055	3057	3075	3102	3130	3153	3166	3162	3133	3074
JD 2444130.5		0	0	0	-12	16	45	73	101	127	-214	-223	-228	-228	-226	-223	-221	-221	-228	-241	-262	-286
1979 SEP 14.0		0	0	0	3559	26	94	163	233	304	3038	3008	2997	3008	3031	3060	3086	3104	3108	3091	3044	2968
JD 2444120.5		0	0	-46	-18	10	39	67	95	0	-227	-233	-235	-234	-232	-229	-229	-232	-240	-256	-276	-294
1979 SEP 4.0		0	0	3480	3547	14	82	151	220	0	2966	2942	2942	2961	2987	3015	3038	3049	3041	3006	2940	2851
JD 2444110.5		0	-80	-53	-24	4	33	62	90	0	-236	-239	-239	-238	-236	-235	-236	-241	-251	-266	-282	-291
1979 AUG 25.0		0	3400	3467	3534	2	70	138	208	0	2893	2880	2890	2914	2942	2967	2984	2985	2961	2907	2825	2732
JD 2444100.5		-112	-86	-59	-31	-2	27	56	0	-236	-240	-241	-241	-240	-239	-239	-241	-247	-257	-269	-276	-276
1979 AUG 15.0		3318	3387	3454	3522	3589	57	126	0	2849	2822	2821	2840	2866	2894	2915	2923	2909	2867	2794	2702	2617
JD 2444090.5		-118	-92	-65	-37	-8	20	50	-236	-239	-241	-241	-241	-240	-239	-240	-243	-249	-256	-260	-258	-253
1979 AUG 5.0		3305	3373	3441	3509	3577	45	113	2811	2770	2756	2766	2790	2818	2842	2855	2851	2821	2759	2671	2581	2514
JD 2444080.5		-124	-98	-71	-43	-14	14	0	-236	-237	-237	-238	-238	-237	-237	-238	-241	-243	-244	-239	-230	-224
1979 JUL 26.0		3291	3360	3428	3496	3564	32	0	2725	2696	2695	2714	2740	2766	2784	2788	2768	2718	2638	2547	2471	2425
	(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E06

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

	(FLT T)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)
JD 2444200.5		0	0	0	0	0	0	0	0	0	0	215	220	0	183	160	141	128	119	114	111	111
1979 NOV 23.0		0	0	0	0	0	0	0	0	0	0	603	625	0	591	508	448	406	376	353	337	324
JD 2444190.5		0	0	0	0	0	0	0	0	0	202	207	213	187	160	137	120	108	100	95	93	93
1979 NOV 13.0		0	0	0	0	0	0	0	0	0	541	564	586	596	502	431	381	346	321	302	288	277
JD 2444180.5		0	0	0	0	0	0	0	0	186	192	198	204	164	135	113	97	87	80	76	74	75
1979 NOV 3.0		0	0	0	0	0	0	0	0	481	503	525	548	502	419	359	318	289	268	253	241	231
JD 2444170.5		0	0	0	0	0	0	0	168	175	182	189	169	136	109	88	74	65	59	56	55	54
1979 OCT 24.0		0	0	0	0	0	0	0	422	443	465	487	506	412	341	292	259	235	217	204	194	186
JD 2444160.5		0	0	0	0	0	0	148	156	164	171	178	140	107	81	63	51	43	38	36	35	36
1979 OCT 14.0		0	0	0	0	0	0	364	385	406	427	448	411	328	269	229	202	182	168	157	148	142
JD 2444150.5		0	0	0	0	0	127	135	144	151	159	146	108	76	53	38	28	21	17	15	15	16
1979 OCT 4.0		0	0	0	0	0	307	327	347	368	389	414	320	250	202	170	147	131	119	110	103	98
JD 2444140.5		0	0	0	0	105	113	122	130	138	146	111	74	45	26	13	4	-1	-4	-5	-5	-3
1979 SEP 24.0		0	0	0	0	251	270	289	309	330	351	317	235	177	139	113	94	81	71	64	58	54
JD 2444130.5		0	0	0	81	90	99	108	116	125	117	74	40	15	-0	-11	-19	-23	-26	-27	-26	-23
1979 SEP 14.0		0	0	0	195	213	233	252	272	292	318	224	155	109	78	57	43	32	24	18	14	11
JD 2444120.5		0	0	56	66	75	84	93	102	0	78	37	7	-13	-26	-36	-42	-46	-48	-48	-47	-44
1979 SEP 4.0		0	0	139	158	176	195	215	234	0	220	137	81	45	20	4	3592	3583	3577	3572	3569	3567
JD 2444110.5		0	31	40	50	59	68	77	86	0	37	0	-24	-41	-52	-60	-65	-68	-70	-70	-68	-65
1979 AUG 25.0		0	84	102	120	139	158	177	197	0	125	56	12	3583	3564	3551	3542	3535	3530	3527	3525	3524
JD 2444100.5		6	15	24	33	43	52	61	0	39	-3	-33	-54	-67	-77	-84	-88	-91	-92	-91	-89	-86
1979 AUG 15.0		29	47	64	83	101	120	139	0	117	35	3581	3547	3524	3509	3499	3492	3486	3483	3481	3480	3480
JD 2444090.5		-10	-1	7	17	26	36	45	44	-4	-41	-65	-82	-93	-101	-107	-110	-113	-113	-113	-111	-108
1979 AUG 5.0		3591	8	26	45	63	82	101	114	19	3553	3510	3484	3467	3455	3447	3442	3438	3436	3435	3435	3436
JD 2444080.5		-27	-18	-9	0	9	19	0	-2	-4	-75	-95	-108	-118	-124	-129	-132	-134	-135	-134	-133	-130
1979 JUL 26.0		3552	3570	3588	6	25	44	0	8	3528	3476	3443	3423	3410	3401	3395	3391	3389	3388	3388	3389	3391

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E06

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

	(FLT T)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)
JD 2444200.5 1979 NOV 23.0		0	0	0	0	0	0	0	0	0	0	1311	1311	0	1311	1311	1311	1311	1311	1311	1311	1311
JD 2444190.5 1979 NOV 13.0		0	0	0	0	0	0	0	0	0	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398
JD 2444180.5 1979 NOV 3.0		0	0	0	0	0	0	0	0	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482
JD 2444170.5 1979 OCT 24.0		0	0	0	0	0	0	0	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562
JD 2444160.5 1979 OCT 14.0		0	0	0	0	0	0	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638
JD 2444150.5 1979 OCT 4.0		0	0	0	0	0	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710
JD 2444140.5 1979 SEP 24.0		0	0	0	0	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777
JD 2444130.5 1979 SEP 14.0		0	0	0	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840
JD 2444120.5 1979 SEP 4.0		0	0	1897	1897	1897	1897	1897	1897	0	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897
JD 2444110.5 1979 AUG 25.0		0	1950	1950	1950	1950	1950	1950	1950	0	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
JD 2444100.5 1979 AUG 15.0		1998	1998	1998	1998	1998	1998	1998	0	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998
JD 2444090.5 1979 AUG 5.0		2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041
JD 2444080.5 1979 JUL 26.0		2080	2080	2080	2080	2080	2080	0	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)

JD2443400.5
1977 SEP 14.0

JD2443440.5
1977 OCT 24.0

JD2443480.5
1977 DEC 3.0

JD2443520.5
1978 JAN 12.0

JD2443560.5
1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E06

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)
JD 2444200.5	0	0	0	0	0	0	0	0	0	0	375	375	0	375	375	375	375	375	375	375	375
1979 NOV 23.0	0	0	0	0	0	0	0	0	0	0	887	887	0	887	887	887	887	887	887	887	887
JD 2444190.5	0	0	0	0	0	0	0	0	0	375	375	375	375	375	375	375	375	375	375	375	375
1979 NOV 13.0	0	0	0	0	0	0	0	0	0	832	832	832	832	832	832	832	832	832	832	832	832
JD 2444180.5	0	0	0	0	0	0	0	0	372	372	372	372	372	372	372	372	372	372	372	372	372
1979 NOV 3.0	0	0	0	0	0	0	0	0	781	781	781	781	781	781	781	781	781	781	781	781	781
JD 2444170.5	0	0	0	0	0	0	0	367	367	367	367	367	367	367	367	367	367	367	367	367	367
1979 OCT 24.0	0	0	0	0	0	0	0	734	734	734	734	734	734	734	734	734	734	734	734	734	734
JD 2444160.5	0	0	0	0	0	0	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360
1979 OCT 14.0	0	0	0	0	0	0	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690
JD 2444150.5	0	0	0	0	0	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352
1979 OCT 4.0	0	0	0	0	0	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648
JD 2444140.5	0	0	0	0	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342
1979 SEP 24.0	0	0	0	0	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609
JD 2444130.5	0	0	0	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331
1979 SEP 14.0	0	0	0	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572
JD 2444120.5	0	0	320	320	320	320	320	320	0	320	320	320	320	320	320	320	320	320	320	320	320
1979 SEP 4.0	0	0	537	537	537	537	537	537	0	537	537	537	537	537	537	537	537	537	537	537	537
JD 2444110.5	0	308	308	308	308	308	308	308	0	308	308	308	308	308	308	308	308	308	308	308	308
1979 AUG 25.0	0	505	505	505	505	505	505	505	0	505	505	505	505	505	505	505	505	505	505	505	505
JD 2444100.5	296	296	296	296	296	296	296	0	296	296	296	296	296	296	296	296	296	296	296	296	296
1979 AUG 15.0	473	473	473	473	473	473	473	0	473	473	473	473	473	473	473	473	473	473	473	473	473
JD 2444090.5	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283
1979 AUG 5.0	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444
JD 2444080.5	270	270	270	270	270	270	0	270	270	270	270	270	270	270	270	270	270	270	270	270	270
1979 JUL 26.0	416	416	416	416	416	416	0	416	416	416	416	416	416	416	416	416	416	416	416	416	416

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E06

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)
JD 2444200.5	0	0	0	0	0	0	0	0	0	0	229	128	0	3521	3420	3319	3218	3118	3018	2919	2820
1979 NOV 23.0	0	0	0	0	0	0	0	0	0	0	1662	1723	0	-1576	-1322	-1111	-935	-785	-650	-526	-410
JD 2444190.5	0	0	0	0	0	0	0	0	0	284	183	82	3573	3475	3374	3273	3172	3072	2972	2872	2774
1979 NOV 13.0	0	0	0	0	0	0	0	0	0	1629	1690	1751	-1721	-1454	-1218	-1024	-862	-719	-590	-470	-356
JD 2444180.5	0	0	0	0	0	0	0	0	339	238	136	37	3530	3429	3328	3226	3126	3025	2925	2826	2727
1979 NOV 3.0	0	0	0	0	0	0	0	0	1597	1658	1718	1778	-1597	-1337	-1121	-943	-790	-655	-530	-413	-303
JD 2444170.5	0	0	0	0	0	0	0	393	292	190	89	3580	3483	3382	3280	3179	3078	2978	2878	2778	2679
1979 OCT 24.0	0	0	0	0	0	0	0	1565	1626	1686	1747	-1740	-1469	-1227	-1030	-866	-722	-592	-471	-357	-248
JD 2444160.5	0	0	0	0	0	0	446	345	244	142	42	3537	3436	3334	3232	3131	3030	2930	2830	2730	2631
1979 OCT 14.0	0	0	0	0	0	0	1535	1595	1655	1715	1775	-1613	-1346	-1125	-945	-791	-655	-529	-412	-301	-194
JD 2444150.5	0	0	0	0	0	497	397	296	195	94	3585	3489	3387	3285	3184	3083	2982	2881	2781	2682	2583
1979 OCT 4.0	0	0	0	0	0	1505	1564	1624	1684	1744	-1754	-1477	-1230	-1030	-864	-719	-589	-468	-353	-244	-139
JD 2444140.5	0	0	0	0	548	448	347	247	146	45	3541	3440	3338	3236	3134	3033	2932	2832	2732	2632	2533
1979 SEP 24.0	0	0	0	0	1476	1535	1594	1654	1714	1773	-1621	-1345	-1123	-941	-786	-649	-524	-406	-294	-187	-84
JD 2444130.5	0	0	0	597	497	398	297	196	95	3588	3491	3390	3288	3186	3084	2983	2882	2782	2682	2582	2483
1979 SEP 14.0	0	0	0	1448	1506	1565	1624	1684	1744	-1763	-1476	-1224	-1023	-856	-711	-581	-459	-344	-235	-129	-28
JD 2444120.5	0	0	644	546	446	347	246	145	0	3542	3440	3339	3237	3135	3033	2932	2831	2730	2630	2531	2432
1979 SEP 4.0	0	0	1421	1479	1537	1596	1655	1714	0	-1618	-1338	-1112	-930	-776	-638	-513	-394	-282	-175	-72	27
JD 2444110.5	0	691	593	494	394	295	194	94	0	3490	3389	3287	3185	3083	2981	2880	2779	2679	2579	2479	2380
1979 AUG 25.0	0	1395	1452	1510	1569	1627	1686	1745	0	-1464	-1210	-1008	-842	-697	-567	-445	-330	-220	-115	-14	83
JD 2444100.5	736	638	540	441	342	242	141	0	3539	3438	3336	3234	3132	3030	2929	2827	2726	2626	2526	2426	2327
1979 AUG 15.0	1370	1427	1484	1542	1600	1658	1717	0	-1604	-1318	-1093	-912	-758	-622	-496	-378	-266	-158	-55	43	139
JD 2444090.5	682	584	486	387	288	188	88	3586	3485	3384	3282	3180	3078	2977	2875	2774	2673	2572	2472	2373	2274
1979 AUG 5.0	1403	1460	1517	1574	1632	1690	1749	-1754	-1440	-1185	-985	-821	-677	-547	-426	-311	-201	-96	4	101	195
JD 2444080.5	627	530	431	333	233	133	0	3532	3431	3329	3228	3126	3024	2922	2820	2719	2618	2517	2417	2318	2219
1979 JUL 26.0	1436	1493	1550	1607	1664	1722	0	-1575	-1288	-1065	-886	-735	-599	-474	-357	-245	-137	-34	64	159	251
(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E06

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)
JD 2444200.5	0	0	0	0	0	0	0	0	0	0	430	759	0	1223	542	355	270	224	196	180	171
1979 NOV 23.0	0	0	0	0	0	0	0	0	0	0	988	996	0	966	855	729	623	541	481	436	404
JD 2444190.5	0	0	0	0	0	0	0	0	0	336	511	1132	3639	744	417	296	236	201	180	168	161
1979 NOV 13.0	0	0	0	0	0	0	0	0	0	982	992	998	996	920	793	673	578	507	455	417	389
JD 2444180.5	0	0	0	0	0	0	0	0	272	377	647	2446	1254	517	332	250	206	180	164	156	152
1979 NOV 3.0	0	0	0	0	0	0	0	0	975	987	996	1000	972	861	731	622	539	477	432	399	376
JD 2444170.5	0	0	0	0	0	0	0	225	293	438	925	4569	707	384	270	213	181	161	150	144	143
1979 OCT 24.0	0	0	0	0	0	0	0	966	981	992	998	998	925	796	673	575	503	450	412	384	365
JD 2444160.5	0	0	0	0	0	0	189	234	321	539	1834	1209	468	296	221	181	158	144	136	133	133
1979 OCT 14.0	0	0	0	0	0	0	957	974	987	995	1000	975	863	730	618	533	471	426	393	370	355
JD 2444150.5	0	0	0	0	0	158	189	245	362	743	5418	628	333	232	182	154	137	127	122	121	123
1979 OCT 4.0	0	0	0	0	0	947	965	980	991	998	999	927	794	668	569	496	443	405	377	358	346
JD 2444140.5	0	0	0	0	133	154	190	260	431	1396	1057	392	245	183	149	130	118	111	109	109	113
1979 SEP 24.0	0	0	0	0	936	956	973	986	995	1000	977	861	724	610	525	463	418	386	363	346	339
JD 2444130.5	0	0	0	110	124	148	191	282	573	5521	503	264	183	143	121	108	100	96	95	97	102
1979 SEP 14.0	0	0	0	925	947	965	980	991	998	999	926	787	658	559	486	434	396	369	351	339	333
JD 2444120.5	0	0	89	99	114	141	193	320	0	795	292	182	136	111	95	87	82	80	81	84	90
1979 SEP 4.0	0	0	914	937	956	973	986	995	0	976	854	713	598	513	452	408	377	355	341	332	329
JD 2444110.5	0	69	76	86	102	132	195	400	0	341	180	125	98	83	74	68	66	65	66	70	77
1979 AUG 25.0	0	903	926	947	965	980	991	998	0	919	774	643	544	473	422	386	360	343	332	327	326
JD 2444100.5	51	54	60	70	87	119	199	0	459	174	109	82	67	58	53	50	49	49	51	55	61
1979 AUG 15.0	891	915	938	957	974	986	995	0	971	840	695	580	497	438	396	367	346	333	326	323	324
JD 2444090.5	34	37	42	51	66	99	208	1352	160	86	60	47	40	36	33	32	32	33	34	38	43
1979 AUG 5.0	904	928	948	956	981	992	998	998	905	754	622	526	457	409	374	351	335	325	320	320	324
JD 2444080.5	16	18	21	26	36	62	0	121	49	31	24	19	17	15	15	14	14	15	16	18	21
1979 JUL 26.0	918	939	959	975	987	996	0	961	818	671	558	479	423	383	356	337	325	319	317	319	325

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E06

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)
JD 2444200.5	0	0	0	0	0	0	0	0	0	0	-19	-5	0	53	226	421	585	712	807	877	929
1979 NOV 23.0	0	0	0	0	0	0	0	0	0	0	3353	3334	0	3065	2879	2680	2516	2392	2302	2236	2189
JD 2444190.5	0	0	0	0	0	0	0	0	0	-29	-12	-2	7	124	319	504	650	761	843	903	947
1979 NOV 13.0	0	0	0	0	0	0	0	0	0	3344	3328	3307	3106	2969	2766	2580	2435	2328	2251	2195	2155
JD 2444180.5	0	0	0	0	0	0	0	0	-42	-20	-6	-0	44	214	412	579	708	804	874	925	962
1979 NOV 3.0	0	0	0	0	0	0	0	0	3334	3321	3302	3278	3040	2857	2654	2487	2361	2270	2204	2157	2123
JD 2444170.5	0	0	0	0	0	0	0	-56	-31	-13	-2	4	115	312	499	648	759	841	901	944	975
1979 OCT 24.0	0	0	0	0	0	0	0	3323	3312	3296	3275	3075	2944	2738	2549	2402	2295	2217	2161	2122	2094
JD 2444160.5	0	0	0	0	0	0	-72	-43	-21	-7	-0	38	208	409	579	708	803	873	924	960	985
1979 OCT 14.0	0	0	0	0	0	0	3310	3301	3288	3269	3246	3012	2828	2622	2452	2326	2235	2169	2122	2089	2067
JD 2444150.5	0	0	0	0	0	-89	-57	-32	-13	-2	2	110	311	501	650	761	842	901	944	973	992
1979 OCT 4.0	0	0	0	0	0	3296	3290	3279	3263	3242	3042	2914	2704	2512	2365	2258	2181	2126	2087	2060	2042
JD 2444140.5	0	0	0	0	-107	-72	-44	-22	-7	-0	35	208	413	584	712	806	875	925	960	983	997
1979 SEP 24.0	0	0	0	0	3282	3277	3269	3255	3236	3213	2980	2793	2582	2412	2287	2196	2132	2086	2054	2032	2019
JD 2444130.5	0	0	0	-125	-88	-57	-32	-13	-2	1	111	317	509	658	767	846	903	944	972	990	999
1979 SEP 14.0	0	0	0	3267	3264	3257	3246	3230	3209	3008	2878	2663	2469	2322	2217	2142	2088	2051	2025	2008	1997
JD 2444120.5	0	0	-145	-106	-71	-43	-22	-7	0	36	217	425	596	722	813	880	927	960	982	995	-998
1979 SEP 4.0	0	0	3251	3250	3245	3236	3222	3203	0	2944	2749	2536	2366	2242	2155	2093	2049	2018	1998	1985	1978
JD 2444110.5	0	-165	-123	-87	-56	-31	-13	-2	0	120	333	526	671	777	853	908	946	973	989	997	-996
1979 AUG 25.0	0	3235	3236	3233	3225	3214	3197	3175	0	2834	2612	2418	2274	2172	2100	2049	2013	1989	1973	1964	1960
JD 2444100.5	-184	-141	-103	-69	-42	-21	-6	0	42	235	447	614	736	824	887	931	962	982	993	-995	-991
1979 AUG 15.0	3219	3221	3220	3214	3204	3190	3170	0	2903	2697	2480	2313	2194	2110	2051	2010	1982	1963	1951	1945	1944
JD 2444090.5	-160	-119	-84	-54	-30	-12	-2	2	138	359	550	691	791	863	914	950	974	988	-993	-992	-985
1979 AUG 5.0	3206	3206	3202	3194	3182	3164	3142	2937	2781	2593	2361	2222	2124	2056	2008	1975	1953	1939	1931	1928	1930
JD 2444080.5	-136	-99	-66	-39	-19	-6	0	56	264	477	639	755	837	896	937	964	982	991	-991	-986	-975
1979 JUL 26.0	3192	3190	3183	3173	3158	3138	0	2894	2636	2417	2256	2142	2064	2009	1971	1945	1928	1918	1914	1913	1917
(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E06

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

	(FLT T)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)
JD 2444200.5		0	0	0	0	0	0	0	0	0	0	117	116	0	1103	536	395	335	302	280	264	251
1979 NOV 23.0		0	0	0	0	0	0	0	0	0	0	273	270	0	425	419	412	404	396	387	378	369
JD 2444190.5		0	0	0	0	0	0	0	0	0	118	117	116	3150	722	453	362	318	291	272	258	245
1979 NOV 13.0		0	0	0	0	0	0	0	0	0	274	271	268	425	421	415	408	400	391	382	373	364
JD 2444180.5		0	0	0	0	0	0	0	0	118	117	116	116	1217	552	400	338	304	282	265	252	240
1979 NOV 3.0		0	0	0	0	0	0	0	0	274	271	269	266	423	418	411	403	394	386	377	368	359
JD 2444170.5		0	0	0	0	0	0	0	119	118	117	116	4172	752	459	364	319	292	274	259	247	236
1979 OCT 24.0		0	0	0	0	0	0	0	275	272	269	267	424	420	414	406	398	389	380	371	362	353
JD 2444160.5		0	0	0	0	0	0	120	118	117	117	116	1315	560	402	339	305	283	266	253	242	231
1979 OCT 14.0		0	0	0	0	0	0	276	273	270	267	265	421	416	409	401	393	384	375	366	357	348
JD 2444150.5		0	0	0	0	0	121	119	118	117	116	5438	769	460	365	320	293	274	260	248	237	227
1979 OCT 4.0		0	0	0	0	0	278	274	271	268	265	422	418	412	405	396	388	379	370	360	351	342
JD 2444140.5		0	0	0	0	122	120	119	118	117	116	1367	561	401	339	305	283	267	254	242	232	222
1979 SEP 24.0		0	0	0	0	279	275	272	268	266	263	420	415	408	400	391	382	373	364	355	346	337
JD 2444130.5		0	0	0	123	121	119	118	117	117	6807	765	457	363	319	293	275	260	248	237	227	218
1979 SEP 14.0		0	0	0	280	276	272	269	266	263	421	417	411	403	395	386	377	368	358	349	340	331
JD 2444120.5		0	0	124	122	120	119	118	117	0	1347	551	397	337	304	283	267	254	243	233	223	214
1979 SEP 4.0		0	0	281	277	273	270	267	264	0	419	413	406	398	389	380	371	362	353	344	334	325
JD 2444110.5		0	125	123	121	120	119	118	117	0	738	447	359	317	292	275	261	248	238	228	219	210
1979 AUG 25.0		0	283	279	275	271	268	265	262	0	415	409	401	393	384	375	365	356	347	338	329	320
JD 2444100.5		126	124	122	121	119	118	117	0	1243	531	389	333	303	282	267	254	243	233	223	214	206
1979 AUG 15.0		284	280	276	272	268	265	262	0	417	412	404	396	387	378	369	360	350	341	332	323	314
JD 2444090.5		125	123	121	120	119	118	117	5362	690	433	353	314	291	274	260	248	238	228	219	210	202
1979 AUG 5.0		281	277	273	269	266	263	260	418	414	407	399	390	382	372	363	354	345	335	326	317	308
JD 2444080.5		124	122	121	119	118	118	0	1081	502	379	328	300	281	266	254	243	233	223	215	206	198
1979 JUL 26.0		278	274	270	267	264	261	0	415	410	402	394	385	376	366	357	348	339	329	320	311	302

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E06

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)
JD 2444200.5 1979 NOV 23.0	0	0	0	0	0	0	0	0	0	0	772	772	0	772	772	772	772	772	772	772	772
JD 2444190.5 1979 NOV 13.0	0	0	0	0	0	0	0	0	0	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444180.5 1979 NOV 3.0	0	0	0	0	0	0	0	0	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444170.5 1979 OCT 24.0	0	0	0	0	0	0	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444160.5 1979 OCT 14.0	0	0	0	0	0	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444150.5 1979 OCT 4.0	0	0	0	0	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444140.5 1979 SEP 24.0	0	0	0	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444130.5 1979 SEP 14.0	0	0	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444120.5 1979 SEP 4.0	0	0	772	772	772	772	772	772	0	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444110.5 1979 AUG 25.0	0	772	772	772	772	772	772	772	0	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444100.5 1979 AUG 15.0	772	772	772	772	772	772	772	0	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444090.5 1979 AUG 5.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444080.5 1979 JUL 26.0	772	772	772	772	772	772	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD2443400.5 1977 SEP 14.0				JD2443440.5 1977 OCT 24.0				JD2443480.5 1977 DEC 3.0				JD2443520.5 1978 JAN 12.0				JD2443560.5 1978 FEB 21.0					

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH -- MARS TRAJECTORY PARAMETERS

M15
E06

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)
JD 2444200.5	0	0	0	0	0	0	0	0	0	0	3653	3819	0	3351	2544	1912	1457	1134	903	737	618
1979 NOV 23.0	0	0	0	0	0	0	0	0	0	0	2849	2954	0	2612	2086	1675	1381	1174	1030	927	854
JD 2444190.5	0	0	0	0	0	0	0	0	0	3559	3728	3894	3817	2953	2216	1669	1282	1008	812	671	571
1979 NOV 13.0	0	0	0	0	0	0	0	0	0	2813	2919	3024	2942	2376	1892	1536	1285	1109	986	898	837
JD 2444180.5	0	0	0	0	0	0	0	0	3464	3636	3804	3968	3404	2573	1923	1457	1130	898	732	613	530
1979 NOV 3.0	0	0	0	0	0	0	0	0	2778	2885	2991	3095	2697	2149	1721	1415	1203	1054	948	874	822
JD 2444170.5	0	0	0	0	0	0	0	3369	3543	3714	3881	3867	2983	2224	1666	1273	998	802	663	564	496
1979 OCT 24.0	0	0	0	0	0	0	0	2744	2852	2959	3064	3031	2445	1941	1570	1312	1132	1005	916	854	811
JD 2444160.5	0	0	0	0	0	0	3274	3449	3622	3792	3957	3434	2580	1914	1443	1114	884	720	603	522	468
1979 OCT 14.0	0	0	0	0	0	0	2711	2819	2927	3034	3139	2771	2201	1755	1440	1222	1071	964	889	837	802
JD 2444150.5	0	0	0	0	0	3180	3355	3530	3702	3870	3895	2988	2210	1643	1250	977	785	649	553	487	446
1979 OCT 4.0	0	0	0	0	0	2678	2786	2895	3003	3110	3109	2500	1974	1592	1328	1145	1018	928	866	823	795
JD 2444140.5	0	0	0	0	3087	3262	3438	3611	3782	3948	3436	2559	1883	1411	1086	860	700	588	510	459	429
1979 SEP 24.0	0	0	0	0	2646	2754	2863	2972	3081	3187	2830	2234	1773	1451	1231	1079	972	898	846	812	791
JD 2444130.5	0	0	0	2995	3170	3346	3521	3693	3862	3896	2962	2169	1601	1212	946	760	629	537	475	437	418
1979 SEP 14.0	0	0	0	2613	2722	2832	2942	3051	3159	3171	2534	1989	1597	1330	1148	1021	933	871	829	803	788
JD 2444120.5	0	0	2905	3080	3255	3431	3604	3775	0	3406	2507	1828	1361	1045	827	675	568	495	448	421	412
1979 SEP 4.0	0	0	2582	2691	2801	2911	3021	3131	0	2866	2244	1771	1446	1227	1076	971	898	848	815	796	787
JD 2444110.5	0	2818	2992	3166	3342	3516	3689	3858	0	2899	2098	1537	1160	904	727	604	519	462	427	411	410
1979 AUG 25.0	0	2550	2659	2769	2880	2991	3102	3211	0	2540	1978	1583	1318	1138	1014	928	869	829	804	791	788
JD 2444100.5	2734	2905	3079	3254	3429	3602	3773	0	3335	2420	1746	1294	992	786	644	545	478	436	413	406	414
1979 AUG 15.0	2518	2627	2737	2849	2961	3072	3183	0	2871	2225	1746	1423	1208	1061	960	890	843	812	795	788	790
JD 2444090.5	2822	2994	3168	3342	3516	3689	3858	3788	2795	1997	1453	1094	853	689	575	498	447	417	405	407	422
1979 AUG 5.0	2594	2705	2817	2929	3042	3154	3265	3219	2512	1940	1547	1288	1114	995	913	858	821	798	787	786	794
JD 2444080.5	2912	3084	3258	3432	3605	3776	0	3217	2295	1641	1212	929	739	609	520	460	424	405	402	412	435
1979 JUL 26.0	2671	2784	2897	3010	3123	3236	0	2837	2170	1694	1380	1173	1033	938	873	829	801	787	782	787	799

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

M15
E06

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)
JD 2444200.5	0	0	0	0	0	0	0	0	0	0	6501	6773	0	5963	4629	3587	2837	2308	1933	1664	1472
1979 NOV 23.0	0	0	0	0	0	0	0	0	0	0	229	128	0	3521	3420	3319	3218	3118	3018	2919	2820
JD 2444190.5	0	0	0	0	0	0	0	0	0	6372	6648	6918	6759	5329	4108	3205	2567	2117	1797	1569	1407
1979 NOV 13.0	0	0	0	0	0	0	0	0	0	284	183	82	3573	3475	3374	3273	3172	3072	2972	2872	2774
JD 2444180.5	0	0	0	0	0	0	0	0	6242	6521	6796	7064	6101	4722	3643	2873	2333	1951	1680	1487	1352
1979 NOV 3.0	0	0	0	0	0	0	0	0	339	238	136	37	3530	3429	3328	3226	3126	3025	2925	2826	2727
JD 2444170.5	0	0	0	0	0	0	0	6113	6394	6672	6945	6808	5428	4165	3236	2585	2130	1808	1579	1418	1307
1979 OCT 24.0	0	0	0	0	0	0	0	393	292	190	89	3580	3483	3382	3280	3179	3078	2978	2878	2778	2679
JD 2444160.5	0	0	0	0	0	0	5985	6268	6549	6825	7096	6205	4780	3669	2882	2336	1954	1684	1492	1359	1270
1979 OCT 14.0	0	0	0	0	0	0	446	345	244	142	42	3537	3436	3334	3232	3131	3030	2930	2830	2730	2631
JD 2444150.5	0	0	0	0	0	5858	6142	6425	6705	6980	7004	5488	4184	3235	2578	2122	1803	1577	1418	1310	1241
1979 OCT 4.0	0	0	0	0	0	497	397	296	195	94	3585	3489	3387	3285	3184	3083	2982	2881	2781	2682	2583
JD 2444140.5	0	0	0	0	5732	6017	6301	6583	6862	7135	6266	4793	3656	2862	2317	1938	1673	1486	1356	1270	1220
1979 SEP 24.0	0	0	0	0	548	448	347	247	146	45	3541	3440	3338	3236	3134	3033	2932	2832	2732	2632	2533
JD 2444130.5	0	0	0	5608	5893	6178	6462	6744	7021	7067	5496	4158	3198	2543	2093	1781	1561	1408	1305	1240	1206
1979 SEP 14.0	0	0	0	597	497	398	297	196	95	3588	3491	3390	3288	3186	3084	2983	2882	2782	2682	2582	2483
JD 2444120.5	0	0	5487	5771	6056	6342	6626	6906	0	6272	4751	3599	2808	2271	1903	1646	1467	1344	1263	1217	1199
1979 SEP 4.0	0	0	644	546	446	347	246	145	0	3542	3440	3339	3237	3135	3033	2932	2831	2730	2630	2531	2432
JD 2444110.5	0	5368	5650	5935	6222	6507	6790	7070	0	5440	4077	3120	2477	2041	1741	1532	1387	1291	1231	1202	1198
1979 AUG 25.0	0	691	593	494	394	295	194	94	0	3490	3389	3287	3185	3083	2981	2880	2779	2679	2579	2479	2380
JD 2444100.5	5251	5532	5816	6103	6389	6674	6956	0	6206	4644	3492	2717	2199	1847	1604	1436	1321	1248	1208	1194	1204
1979 AUG 15.0	736	638	540	441	342	242	141	0	3539	3438	3336	3234	3132	3030	2929	2827	2726	2626	2526	2426	2327
JD 2444090.5	5416	5699	5985	6272	6558	6843	7123	7006	5307	3936	3000	2381	1967	1684	1489	1355	1268	1216	1192	1193	1216
1979 AUG 5.0	682	584	486	387	288	188	88	3586	3485	3384	3282	3180	3078	2977	2875	2774	2673	2572	2472	2373	2274
JD 2444080.5	5583	5868	6155	6442	6728	7012	0	6054	4465	3335	2592	2102	1772	1547	1392	1289	1225	1192	1184	1199	1234
1979 JUL 26.0	627	530	431	333	233	133	0	3532	3431	3329	3228	3126	3024	2922	2820	2719	2618	2517	2417	2318	2219

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

M15
E07

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2443900.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671796	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.581	DEGREES
MEAN ANOM. AT EPOCH	=	23.104	DEGREES
DATE OF NODAL PASSAGE	=	2444140.139	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2443900.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338610	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.396	DEGREES
ARG. OF PERIHELION	=	286.278	DEGREES
MEAN ANOM. AT EPOCH	=	333.510	DEGREES
DATE OF NODAL PASSAGE	=	2443385.555	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.057	DEGREES

M15
E07

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD 2444200.5	289	241	205	181	171	175	191	217	251	299	437	541	420	454	500	551	606	663	723	785	850
1979 NOV 23.0	364	346	333	326	322	322	325	331	340	356	414	477	406	418	438	461	487	515	546	579	613
JD 2444190.5	262	220	190	173	169	179	200	229	268	331	1098	419	429	471	520	572	628	686	747	811	876
1979 NOV 13.0	358	342	332	327	325	326	330	338	349	371	811	414	413	430	452	476	503	533	564	598	633
JD 2444180.5	238	202	178	167	171	186	210	243	288	407	527	409	444	490	540	594	651	710	772	837	903
1979 NOV 3.0	352	340	332	328	328	331	336	345	359	406	480	411	423	443	466	492	520	550	583	618	654
JD 2444170.5	216	186	169	165	174	194	223	260	317	1001	405	419	462	510	562	617	675	735	798	863	931
1979 OCT 24.0	348	338	332	330	331	336	343	353	372	757	416	418	435	457	481	508	538	569	603	639	676
JD 2444160.5	197	174	163	166	181	205	237	279	382	488	399	435	481	531	585	641	699	761	825	891	959
1979 OCT 14.0	345	337	333	333	336	341	350	362	401	469	414	428	448	472	497	525	556	589	623	660	699
JD 2444150.5	181	164	161	170	190	218	253	305	987	388	411	454	502	554	608	665	725	787	852	919	988
1979 OCT 4.0	342	337	335	336	340	347	357	374	757	416	422	440	462	487	514	544	575	609	645	683	722
JD 2444140.5	168	158	162	177	201	232	271	360	433	389	428	474	524	577	632	691	751	815	881	949	1019
1979 SEP 24.0	341	337	337	340	346	354	366	398	447	417	433	454	477	503	532	562	595	630	667	706	747
JD 2444130.5	159	156	166	186	214	248	294	1131	373	404	448	496	547	601	658	717	779	843	910	979	1049
1979 SEP 14.0	340	338	340	344	351	361	376	864	415	426	445	468	493	520	550	582	616	652	691	731	772
JD 2444120.5	153	158	174	198	228	265	340	380	382	423	470	519	571	626	684	744	807	872	940	1010	1081
1979 SEP 4.0	339	340	343	349	357	369	394	425	420	437	459	483	509	538	569	602	638	675	715	756	799
JD 2444110.5	152	164	184	212	245	286	1221	362	400	445	493	543	597	653	711	773	836	903	971	1042	1114
1979 AUG 25.0	340	342	347	354	364	377	973	414	430	450	473	499	527	557	589	624	660	699	740	782	826
JD 2444100.5	156	173	197	227	262	320	347	378	421	468	517	568	623	680	739	802	867	934	1003	1075	1147
1979 AUG 15.0	341	344	351	360	371	391	411	422	441	463	488	515	545	576	610	646	684	724	766	809	854
JD 2444090.5	163	184	212	244	281	402	357	399	444	491	542	594	650	708	769	832	898	966	1036	1108	1182
1979 AUG 5.0	342	347	355	366	378	447	414	432	454	478	504	532	563	596	631	669	708	749	792	837	883
JD 2444080.5	173	198	228	262	302	337	378	422	468	516	568	621	678	737	799	863	930	999	1070	1143	1217
1979 JUL 26.0	344	351	361	372	387	405	423	444	467	493	520	550	583	617	654	693	733	776	820	866	913

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)

JD2443600.5
1978 APR 2.0

JD2443640.5
1978 MAY 12.0

JD2443680.5
1978 JUN 21.0

JD2443720.5
1978 JUL 31.0

JD2443760.5
1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E07

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

	(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD 2444200.5		-131	-145	-172	-209	-251	-288	-314	-334	-361	-419	-639	300	25	-37	-50	-46	-33	-15	5	29	53
1979 NOV 23.0		3464	3461	3438	3389	3318	3242	3183	3152	3152	3186	3290	2927	3160	3243	3309	3372	3434	3496	3558	21	84
JD 2444190.5		-152	-171	-202	-242	-281	-311	-332	-353	-389	-490	-728	96	-32	-64	-68	-59	-43	-24	-2	21	46
1979 NOV 13.0		3420	3409	3373	3311	3233	3160	3112	3095	3109	3162	1818	3055	3163	3233	3297	3360	3421	3483	3545	8	71
JD 2444180.5		-174	-198	-233	-272	-305	-329	-347	-371	-426	-633	286	-8	-71	-85	-82	-71	-53	-33	-10	13	38
1979 NOV 3.0		3371	3347	3297	3223	3143	3079	3044	3041	3070	3149	2865	3078	3156	3221	3284	3346	3408	3470	3532	3595	58
JD 2444170.5		-198	-226	-263	-298	-323	-341	-359	-392	-487	-728	59	-68	-99	-103	-96	-81	-63	-41	-18	6	31
1979 OCT 24.0		3313	3276	3211	3129	3052	3000	2981	2992	3034	1730	2980	3076	3144	3208	3270	3332	3395	3457	3519	3582	44
JD 2444160.5		-223	-254	-288	-316	-335	-349	-371	-422	-620	248	-47	-106	-120	-118	-107	-91	-72	-50	-26	-1	24
1979 OCT 14.0		3246	3193	3114	3029	2962	2926	2922	2945	2997	2820	2994	3066	3130	3193	3256	3318	3381	3443	3506	3568	31
JD 2444150.5		-247	-279	-307	-327	-340	-354	-384	-472	-694	8	-105	-133	-137	-131	-118	-101	-81	-58	-34	-9	16
1979 OCT 4.0		3167	3097	3010	2930	2878	2858	2867	2900	1661	2905	2987	3052	3115	3178	3241	3304	3367	3429	3492	3554	17
JD 2444140.5		-270	-297	-317	-329	-340	-358	-403	-593	173	-92	-141	-153	-152	-142	-128	-110	-89	-66	-42	-16	9
1979 SEP 24.0		3074	2990	2902	2835	2800	2795	2815	2842	2783	2906	2972	3035	3098	3162	3225	3289	3352	3415	3478	3540	2
JD 2444130.5		-286	-306	-318	-325	-336	-361	-440	-594	-53	-143	-166	-169	-164	-152	-137	-118	-97	-74	-50	-24	1
1979 SEP 14.0		2968	2876	2797	2747	2730	2738	2764	1593	2824	2892	2954	3017	3081	3145	3210	3274	3337	3400	3463	3525	3588
JD 2444120.5		-294	-305	-310	-316	-330	-368	-546	58	-138	-174	-184	-182	-174	-161	-145	-126	-105	-82	-57	-32	-6
1979 SEP 4.0		2851	2763	2699	2669	2666	2685	2696	2733	2812	2873	2935	2999	3064	3129	3193	3258	3322	3385	3448	3511	3573
JD 2444110.5		-291	-294	-296	-303	-322	-388	477	-120	-179	-195	-197	-193	-183	-170	-153	-134	-113	-90	-65	-40	-13
1979 AUG 25.0		2732	2656	2612	2600	2610	2634	2154	2732	2791	2852	2915	2980	3046	3111	3177	3242	3306	3370	3433	3495	3557
JD 2444100.5		-276	-275	-277	-286	-315	-468	-74	-181	-203	-209	-208	-202	-191	-178	-161	-142	-120	-97	-73	-48	-21
1979 AUG 15.0		2617	2561	2537	2540	2560	2568	2653	2708	2767	2830	2894	2961	3027	3094	3160	3226	3290	3354	3417	3479	3541
JD 2444090.5		-253	-250	-254	-267	-309	174	-181	-210	-218	-220	-216	-209	-198	-185	-168	-149	-128	-105	-81	-56	-30
1979 AUG 5.0		2514	2479	2473	2488	2514	2561	2626	2682	2743	2807	2874	2941	3009	3076	3143	3209	3274	3338	3401	3463	3525
JD 2444080.5		-224	-222	-227	-241	-321	-187	-216	-225	-228	-227	-223	-216	-205	-191	-175	-156	-135	-113	-89	-64	-38
1979 JUL 26.0		2425	2410	2418	2444	2469	2542	2595	2655	2719	2785	2853	2921	2990	3058	3125	3191	3257	3321	3384	3446	3508

	(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E07

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

	(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD 2444200.5		111	112	115	120	126	135	146	162	186	235	406	-164	27	80	108	126	141	153	164	174	183
1979 NOV 23.0		324	314	306	301	297	295	294	294	292	286	256	524	404	395	400	412	426	442	461	481	503
JD 2444190.5		93	95	98	103	110	119	132	151	182	259	686	-44	45	80	102	118	132	143	154	164	174
1979 NOV 13.0		277	269	262	258	255	254	253	252	249	234	492	386	353	353	361	373	388	405	424	444	466
JD 2444180.5		75	77	81	86	94	104	118	141	184	337	-185	0	50	76	94	109	121	133	144	154	164
1979 NOV 3.0		231	224	219	216	214	212	212	210	203	169	445	318	308	312	322	336	351	369	388	408	430
JD 2444170.5		56	58	62	69	77	88	105	133	201	642	-65	16	49	69	85	98	110	122	132	143	153
1979 OCT 24.0		186	181	177	174	172	172	171	167	152	275	298	265	265	273	284	298	314	332	351	372	394
JD 2444160.5		36	39	44	50	60	72	92	130	267	-195	-24	19	43	60	74	87	98	110	120	131	141
1979 OCT 14.0		142	137	134	132	131	131	129	122	88	346	228	220	224	234	247	261	278	296	315	336	359
JD 2444150.5		16	20	25	32	42	56	81	140	602	-82	-12	16	35	49	62	74	86	97	108	119	129
1979 OCT 4.0		98	95	92	91	91	90	87	73	153	203	176	177	184	196	209	224	241	260	280	301	323
JD 2444140.5		-3	0	6	13	24	41	74	197	-191	-48	-11	9	24	37	49	61	72	83	95	106	117
1979 SEP 24.0		54	52	50	50	50	49	43	10	226	135	130	135	145	158	172	188	205	224	244	265	288
JD 2444130.5		-23	-19	-13	-5	6	27	77	585	-94	-40	-16	-0	12	24	36	47	58	70	81	92	103
1979 SEP 14.0		11	9	9	9	9	7	3595	133	101	84	87	95	106	120	135	151	169	188	209	230	253
JD 2444120.5		-44	-40	-33	-24	-11	15	123	-173	-71	-42	-25	-12	-0	11	22	33	44	55	67	78	90
1979 SEP 4.0		3567	3567	3567	3567	3568	3564	3534	93	39	38	45	55	68	82	98	115	133	152	173	195	219
JD 2444110.5		-65	-61	-54	-44	-28	10	-277	-105	-68	-50	-37	-25	-14	-3	7	18	29	41	52	64	76
1979 AUG 25.0		3524	3524	3525	3526	3526	3518	506	3596	3589	3585	4	16	29	44	60	78	97	117	138	160	184
JD 2444100.5		-86	-82	-75	-65	-46	41	-149	-92	-73	-61	-49	-39	-28	-18	-7	3	14	26	37	49	62
1979 AUG 15.0		3480	3481	3483	3485	3484	3459	3559	3539	3543	3552	3563	3576	3591	6	23	41	61	81	103	126	150
JD 2444090.5		-108	-103	-97	-87	-61	-287	-115	-95	-83	-73	-63	-53	-43	-33	-22	-11	-0	10	22	34	47
1979 AUG 5.0		3436	3438	3441	3443	3441	3	3487	3491	3499	3510	3523	3537	3552	3568	3586	5	24	45	68	91	115
JD 2444080.5		-130	-126	-120	-111	-68	-132	-114	-104	-95	-86	-77	-68	-58	-48	-38	-27	-16	-4	7	19	32
1979 JUL 26.0		3391	3395	3399	3402	3393	3433	3436	3445	3456	3469	3482	3497	3513	3530	3548	3568	3588	10	32	56	81
	(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E07

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD 2444200.5 1979 NOV 23.0	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311
JD 2444190.5 1979 NOV 13.0	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398
JD 2444180.5 1979 NOV 3.0	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482
JD 2444170.5 1979 OCT 24.0	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562
JD 2444160.5 1979 OCT 14.0	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638
JD 2444150.5 1979 OCT 4.0	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710
JD 2444140.5 1979 SEP 24.0	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777
JD 2444130.5 1979 SEP 14.0	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840
JD 2444120.5 1979 SEP 4.0	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897
JD 2444110.5 1979 AUG 25.0	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
JD 2444100.5 1979 AUG 15.0	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998
JD 2444090.5 1979 AUG 5.0	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041
JD 2444080.5 1979 JUL 26.0	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

M15
E07

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD 2444200.5	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375
1979 NOV 23.0	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887
JD 2444190.5	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375
1979 NOV 13.0	832	832	832	832	832	332	832	832	832	832	832	832	832	832	832	832	832	832	832	832	832
JD 2444180.5	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372
1979 NOV 3.0	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781
JD 2444170.5	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367
1979 OCT 24.0	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734
JD 2444160.5	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360
1979 OCT 14.0	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690
JD 2444150.5	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352
1979 OCT 4.0	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648
JD 2444140.5	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342
1979 SEP 24.0	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609
JD 2444130.5	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331
1979 SEP 14.0	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572
JD 2444120.5	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320
1979 SEP 4.0	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537
JD 2444110.5	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308
1979 AUG 25.0	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505
JD 2444100.5	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296
1979 AUG 15.0	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473
JD 2444090.5	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283
1979 AUG 5.0	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444
JD 2444080.5	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270
1979 JUL 26.0	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E07

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

	(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD 2444200.5		2820	2721	2624	2526	2430	2333	2237	2142	2047	1952	1858	1757	1663	1568	1472	1376	1279	1182	1084	985	886
1979 NOV 23.0		-410	-300	-195	-93	3	97	188	276	360	442	520	602	676	748	820	890	959	1027	1094	1160	1226
JD 2444190.5		2774	2675	2577	2480	2383	2287	2191	2096	2000	1906	1818	1712	1617	1522	1426	1330	1233	1135	1038	939	840
1979 NOV 13.0		-356	-248	-145	-45	50	143	232	318	402	482	553	639	712	784	855	924	992	1060	1126	1192	1258
JD 2444180.5		2727	2628	2531	2433	2337	2240	2144	2049	1954	1860	1759	1666	1571	1475	1379	1283	1186	1089	991	892	793
1979 NOV 3.0		-303	-197	-95	2	97	188	276	361	443	522	603	677	749	821	890	959	1026	1093	1159	1224	1289
JD 2444170.5		2679	2581	2483	2386	2289	2193	2097	2002	1907	1818	1714	1619	1524	1428	1332	1236	1139	1041	944	845	746
1979 OCT 24.0		-248	-144	-44	52	145	235	321	405	485	558	642	715	787	857	926	994	1060	1126	1192	1257	1321
JD 2444160.5		2631	2533	2435	2338	2241	2145	2049	1954	1859	1760	1666	1571	1476	1380	1284	1188	1091	993	896	797	698
1979 OCT 14.0		-194	-92	6	101	193	281	366	448	527	608	681	754	824	894	962	1029	1095	1160	1225	1289	1353
JD 2444150.5		2583	2484	2387	2289	2193	2096	2000	1905	1815	1713	1618	1523	1427	1331	1235	1139	1042	945	847	748	649
1979 OCT 4.0		-139	-38	58	151	241	328	412	492	566	648	721	793	862	931	998	1064	1129	1194	1258	1322	1386
JD 2444140.5		2533	2435	2337	2240	2143	2047	1951	1856	1758	1664	1569	1473	1378	1282	1186	1090	993	895	797	699	600
1979 SEP 24.0		-84	14	109	201	290	375	457	536	615	689	761	832	900	968	1034	1100	1164	1228	1292	1355	1418
JD 2444130.5		2483	2385	2287	2190	2093	1997	1901	1811	1709	1614	1518	1423	1328	1232	1136	1039	942	845	747	649	550
1979 SEP 14.0		-28	68	162	252	339	423	503	576	658	731	802	871	939	1005	1071	1135	1199	1263	1326	1388	1451
JD 2444120.5		2432	2334	2236	2139	2042	1946	1850	1753	1658	1563	1467	1372	1277	1181	1085	988	891	794	696	598	499
1979 SEP 4.0		27	122	214	303	388	470	549	627	700	772	842	910	977	1043	1107	1171	1234	1297	1360	1422	1485
JD 2444110.5		2380	2282	2184	2087	1990	1894	1793	1702	1606	1511	1416	1320	1225	1129	1033	936	840	742	644	546	447
1979 AUG 25.0		83	176	267	354	437	517	599	671	743	814	883	950	1016	1080	1144	1207	1270	1332	1394	1456	1518
JD 2444100.5		2327	2229	2131	2034	1937	1841	1745	1649	1554	1458	1363	1267	1172	1076	980	884	787	689	591	493	394
1979 AUG 15.0		139	231	319	404	486	565	641	715	786	856	923	989	1054	1118	1181	1243	1305	1367	1429	1490	1552
JD 2444090.5		2274	2175	2078	1980	1883	1787	1691	1595	1500	1404	1309	1214	1118	1022	926	830	733	636	538	439	340
1979 AUG 5.0		195	285	372	455	535	613	687	759	829	897	964	1029	1093	1156	1218	1280	1341	1402	1464	1525	1586
JD 2444080.5		2219	2121	2023	1926	1829	1732	1636	1541	1445	1350	1254	1159	1064	968	872	775	678	581	483	385	286
1979 JUL 26.0		251	339	424	505	583	659	732	803	872	939	1004	1068	1132	1194	1255	1316	1377	1438	1499	1560	1621
	(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E07

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

	(FLT T) (600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD 2444200.5	171	167	168	175	187	208	242	297	401	640	1684	2263	709	424	308	248	212	189	176	169	167
1979 NOV 23.0	404	381	366	357	352	353	357	364	376	390	407	429	453	479	509	541	577	614	654	696	738
JD 2444190.5	161	160	164	173	188	213	254	324	467	876	6050	1054	511	343	264	219	191	175	165	160	161
1979 NOV 13.0	389	370	358	351	349	351	357	366	379	395	411	436	461	489	520	554	591	629	670	712	755
JD 2444180.5	152	153	159	170	189	219	269	361	574	1480	2196	657	390	283	227	194	173	161	154	152	155
1979 NOV 3.0	376	361	351	347	347	351	358	369	383	400	422	445	471	501	533	568	606	645	687	730	773
JD 2444170.5	143	146	154	167	189	225	288	414	774	5427	956	460	308	236	196	171	156	147	143	143	148
1979 OCT 24.0	365	352	345	343	345	351	360	372	388	405	429	454	482	513	546	583	621	662	705	748	791
JD 2444160.5	133	138	148	164	190	234	314	500	1295	1934	573	341	247	198	169	151	140	134	132	135	141
1979 OCT 14.0	355	345	341	341	345	352	363	377	394	415	438	464	494	526	561	598	638	680	723	766	810
JD 2444150.5	123	130	142	160	191	245	353	664	5351	799	387	260	200	166	145	132	125	121	121	125	133
1979 OCT 4.0	346	339	337	339	345	354	367	382	399	423	448	476	506	540	576	615	656	698	742	786	829
JD 2444140.5	113	121	134	156	192	259	416	1116	1500	460	276	201	161	138	123	115	110	108	110	115	125
1979 SEP 24.0	339	335	335	339	347	358	372	389	410	433	459	488	520	555	593	633	674	718	761	805	848
JD 2444130.5	102	111	126	151	194	282	542	6318	599	297	201	155	129	113	103	98	95	95	98	105	116
1979 SEP 14.0	333	331	334	340	349	362	377	395	418	443	471	502	535	571	610	651	694	738	782	825	867
JD 2444120.5	90	100	116	144	196	319	924	986	328	200	146	118	101	91	85	81	80	82	86	93	105
1979 SEP 4.0	329	329	334	342	353	367	384	405	428	455	484	516	551	589	629	671	714	758	802	845	886
JD 2444110.5	77	87	104	135	199	399	6943	380	196	134	104	87	77	70	67	65	65	67	72	80	92
1979 AUG 25.0	326	329	335	345	358	374	394	415	440	468	498	532	568	607	648	691	735	780	823	865	905
JD 2444100.5	61	72	89	123	205	682	505	187	117	87	70	61	55	51	49	49	50	52	57	64	77
1979 AUG 15.0	324	329	338	349	364	381	402	426	452	482	514	549	587	627	669	713	757	801	845	885	923
JD 2444090.5	43	52	68	103	219	1379	168	91	64	50	42	37	34	33	32	32	33	35	39	46	57
1979 AUG 5.0	324	331	341	355	371	390	413	438	466	497	531	567	607	648	691	735	780	824	866	905	940
JD 2444080.5	21	27	38	66	284	121	51	33	25	20	18	16	15	14	14	15	15	17	19	23	30
1979 JUL 26.0	325	334	346	361	379	400	424	451	481	514	549	587	627	670	713	758	802	846	887	924	956

(FLT T) (480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

M15
E07

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD 2444200.5	929	965	990	1004	-1009	-1008	-999	-984	-962	-935	-903	-861	-819	-770	-717	-660	-600	-537	-473	-408	-344
1979 NOV 23.0	2189	2155	2132	2118	2110	2107	2109	2114	2122	2132	2144	2160	2174	2190	2206	2223	2238	2253	2267	2279	2289
JD 2444190.5	947	977	997	1007	-1008	-1003	-991	-973	-949	-920	-888	-842	-797	-746	-692	-633	-572	-509	-444	-379	-316
1979 NOV 13.0	2155	2127	2108	2097	2092	2091	2094	2101	2110	2121	2130	2149	2164	2180	2196	2212	2227	2241	2254	2265	2273
JD 2444180.5	962	987	1002	-1007	-1005	-997	-983	-962	-935	-903	-863	-821	-774	-721	-665	-605	-543	-479	-415	-350	-288
1979 NOV 3.0	2123	2100	2085	2077	2074	2076	2081	2088	2098	2110	2125	2139	2154	2170	2186	2201	2216	2229	2240	2250	2257
JD 2444170.5	975	994	1004	-1006	-1001	-990	-972	-948	-919	-887	-843	-799	-749	-695	-637	-576	-514	-449	-385	-321	-260
1979 OCT 24.0	2094	2075	2064	2059	2058	2061	2067	2076	2087	2097	2115	2129	2144	2160	2175	2190	2204	2216	2226	2234	2239
JD 2444160.5	985	999	-1004	-1003	-995	-980	-960	-933	-902	-863	-821	-774	-723	-667	-608	-547	-483	-419	-355	-292	-232
1979 OCT 14.0	2067	2052	2044	2041	2043	2048	2055	2065	2076	2091	2104	2119	2135	2150	2165	2179	2191	2203	2212	2218	2221
JD 2444150.5	992	1002	-1003	-998	-987	-969	-946	-917	-885	-842	-798	-749	-695	-638	-578	-516	-452	-388	-324	-263	-205
1979 OCT 4.0	2042	2031	2026	2025	2028	2035	2043	2054	2064	2080	2095	2110	2125	2139	2154	2167	2179	2188	2196	2201	2202
JD 2444140.5	997	-1001	-1000	-991	-977	-956	-930	-899	-861	-819	-773	-722	-666	-608	-547	-484	-420	-356	-294	-234	-179
1979 SEP 24.0	2019	2011	2009	2010	2015	2022	2032	2043	2057	2071	2085	2100	2115	2129	2142	2155	2165	2174	2180	2183	2182
JD 2444130.5	999	-1000	-994	-982	-965	-941	-913	-881	-839	-795	-746	-693	-636	-577	-515	-452	-388	-325	-264	-206	-153
1979 SEP 14.0	1997	1993	1993	1996	2002	2011	2022	2031	2047	2061	2076	2090	2105	2118	2131	2142	2151	2158	2163	2164	2161
JD 2444120.5	-998	-996	-987	-972	-951	-925	-893	-856	-815	-768	-717	-663	-605	-544	-482	-419	-355	-294	-234	-179	-128
1979 SEP 4.0	1978	1976	1978	1983	1991	2000	2012	2025	2038	2052	2067	2081	2095	2107	2119	2129	2137	2142	2145	2143	2138
JD 2444110.5	-996	-990	-977	-959	-935	-906	-870	-833	-789	-740	-688	-632	-572	-511	-448	-385	-323	-262	-205	-152	-105
1979 AUG 25.0	1960	1961	1964	1971	1980	1990	2005	2016	2029	2043	2057	2071	2084	2096	2107	2115	2122	2125	2126	2122	2115
JD 2444100.5	-991	-982	-966	-945	-918	-886	-849	-807	-761	-711	-656	-599	-539	-477	-414	-351	-290	-231	-176	-127	-83
1979 AUG 15.0	1944	1947	1952	1960	1970	1981	1994	2007	2021	2035	2048	2062	2074	2085	2094	2101	2106	2107	2106	2100	2089
JD 2444090.5	-985	-971	-952	-928	-898	-864	-824	-780	-732	-680	-624	-565	-504	-442	-379	-318	-258	-201	-149	-102	-63
1979 AUG 5.0	1930	1934	1941	1950	1961	1973	1985	1999	2012	2026	2039	2052	2063	2073	2081	2086	2089	2089	2084	2076	2063
JD 2444080.5	-975	-959	-937	-909	-877	-840	-798	-752	-701	-647	-590	-530	-469	-407	-345	-284	-226	-172	-123	-80	-45
1979 JUL 26.0	1917	1922	1931	1941	1952	1964	1978	1991	2004	2018	2030	2042	2052	2061	2067	2071	2071	2069	2062	2051	2035
(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)

JD2443600.5
1978 APR 2.0

JD2443640.5
1978 MAY 12.0

JD2443680.5
1978 JUN 21.0

JD2443720.5
1978 JUL 31.0

JD2443760.5
1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

M15
E07

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD 2444200.5	251	239	229	220	211	203	195	187	180	174	167	161	155	149	143	138	133	129	124	120	116
1979 NOV 23.0	369	360	351	342	333	325	316	307	299	291	283	274	266	259	251	244	237	230	223	217	211
JD 2444190.5	245	235	225	216	207	199	192	184	177	171	165	158	152	146	141	136	131	126	122	118	114
1979 NOV 13.0	364	355	346	337	328	319	311	302	294	286	278	269	261	254	246	239	232	225	219	212	206
JD 2444180.5	240	230	221	212	204	196	188	181	174	168	161	155	149	144	138	133	129	124	120	116	112
1979 NOV 3.0	359	350	341	332	323	314	305	297	289	280	272	264	257	249	242	234	228	221	214	208	202
JD 2444170.5	236	226	217	208	200	192	185	178	171	165	158	152	147	141	136	131	126	122	118	114	111
1979 OCT 24.0	353	344	335	326	317	309	300	292	283	276	267	259	252	244	237	230	223	216	210	204	198
JD 2444160.5	231	222	213	204	197	189	182	175	168	161	155	150	144	139	134	129	124	120	116	112	109
1979 OCT 14.0	348	339	330	321	312	303	295	286	278	270	262	254	247	239	232	225	218	212	206	200	194
JD 2444150.5	227	218	209	201	193	186	178	172	165	159	153	147	141	136	131	127	122	118	114	111	107
1979 OCT 4.0	342	333	324	315	307	298	289	281	273	265	257	249	242	234	227	220	214	207	201	195	190
JD 2444140.5	222	214	205	197	190	182	175	168	162	156	150	144	139	134	129	124	120	116	112	109	106
1979 SEP 24.0	337	328	319	310	301	293	284	276	268	260	252	244	237	230	223	216	209	203	197	191	186
JD 2444130.5	218	210	201	194	186	179	172	166	159	153	147	141	136	131	126	122	118	114	110	107	104
1979 SEP 14.0	331	322	313	304	296	287	279	271	262	254	247	239	232	225	218	211	205	199	193	187	182
JD 2444120.5	214	206	198	190	183	175	169	162	156	150	144	139	134	129	124	120	116	112	108	105	102
1979 SEP 4.0	325	316	307	299	290	282	273	265	257	249	242	234	227	220	213	207	200	194	188	183	178
JD 2444110.5	210	202	194	186	179	172	165	159	153	147	141	136	131	126	122	118	114	110	107	104	101
1979 AUG 25.0	320	311	302	293	285	276	268	260	252	244	236	229	222	215	208	202	196	190	184	179	174
JD 2444100.5	206	198	190	183	176	169	162	156	150	144	139	133	128	124	119	115	112	108	105	102	99
1979 AUG 15.0	314	305	296	287	279	271	262	254	246	239	231	224	217	210	204	197	191	185	180	175	170
JD 2444090.5	202	194	186	179	172	165	159	153	147	141	136	131	126	121	117	113	110	106	103	100	98
1979 AUG 5.0	308	299	290	282	273	265	257	249	241	234	226	219	212	205	199	193	187	181	176	171	166
JD 2444080.5	198	190	183	175	169	162	156	150	144	138	133	128	123	119	115	111	108	104	101	99	97
1979 JUL 26.0	302	293	285	276	268	259	251	244	236	228	221	214	207	201	194	188	182	177	172	166	162

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E07

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD 2444200.5 1979 NOV 23.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444190.5 1979 NOV 13.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444180.5 1979 NOV 3.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444170.5 1979 OCT 24.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444160.5 1979 OCT 14.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444150.5 1979 OCT 4.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444140.5 1979 SEP 24.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444130.5 1979 SEP 14.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444120.5 1979 SEP 4.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444110.5 1979 AUG 25.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444100.5 1979 AUG 15.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444090.5 1979 AUG 5.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444080.5 1979 JUL 26.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
	JD2443600.5 1978 APR 2.0			JD2443640.5 1978 MAY 12.0				JD2443680.5 1978 JUN 21.0				JD2443720.5 1978 JUL 31.0				JD2443760.5 1978 SEP 9.0				

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E07

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD 2444200.5	618	534	479	446	433	438	459	496	551	636	927	1175	889	966	1075	1200	1337	1485	1642	1810	1985
1979 NOV 23.0	854	804	770	750	740	740	748	764	790	831	992	1171	971	1005	1061	1126	1199	1280	1367	1461	1561
JD 2444190.5	571	502	458	435	431	443	471	515	580	699	2676	887	908	1006	1123	1253	1394	1545	1707	1878	2057
1979 NOV 13.0	837	795	767	752	747	751	763	783	813	873	2137	992	990	1038	1099	1168	1245	1329	1419	1516	1619
JD 2444180.5	530	474	442	428	432	452	487	538	617	859	1140	865	942	1050	1173	1308	1453	1609	1774	1948	2131
1979 NOV 3.0	822	788	767	756	755	763	779	803	840	971	1180	984	1019	1074	1140	1213	1293	1380	1474	1574	1680
JD 2444170.5	496	453	430	425	437	464	506	566	672	2403	854	886	984	1099	1227	1366	1515	1675	1844	2022	2208
1979 OCT 24.0	811	783	768	762	765	777	796	825	877	1977	999	1003	1052	1113	1183	1259	1343	1434	1531	1634	1743
JD 2444160.5	468	436	423	427	445	479	528	600	804	1046	841	923	1030	1151	1283	1426	1580	1743	1916	2097	2287
1979 OCT 14.0	802	781	770	769	777	792	815	850	957	1148	994	1033	1089	1155	1228	1308	1396	1490	1590	1697	1809
JD 2444150.5	446	424	420	432	457	498	554	648	2363	819	868	966	1080	1206	1343	1490	1648	1815	1991	2176	2368
1979 OCT 4.0	795	780	775	778	790	809	836	882	1978	999	1016	1067	1129	1199	1276	1360	1451	1549	1653	1762	1878
JD 2444140.5	429	417	421	440	473	520	586	757	917	820	907	1014	1133	1264	1405	1557	1718	1889	2069	2257	2452
1979 SEP 24.0	791	781	780	788	804	827	859	947	1086	1002	1046	1104	1171	1245	1326	1414	1509	1610	1717	1831	1950
JD 2444130.5	418	415	427	453	492	546	628	2769	786	853	953	1066	1190	1325	1471	1626	1792	1966	2150	2341	2539
1979 SEP 14.0	788	784	788	800	819	846	887	2291	997	1027	1081	1144	1215	1294	1379	1471	1569	1674	1785	1902	2024
JD 2444120.5	412	417	437	469	514	576	716	800	805	896	1003	1121	1250	1390	1539	1699	1868	2047	2233	2428	2629
1979 SEP 4.0	787	788	796	813	836	867	938	1025	1009	1058	1119	1187	1262	1345	1434	1530	1632	1741	1855	1976	2101
JD 2444110.5	410	424	450	489	540	613	3025	762	844	945	1057	1180	1314	1457	1611	1775	1948	2130	2320	2517	2721
1979 AUG 25.0	788	793	806	827	854	891	2612	994	1037	1094	1159	1232	1312	1398	1491	1591	1698	1810	1928	2052	2181
JD 2444100.5	414	435	468	512	570	678	732	796	891	998	1115	1242	1380	1528	1686	1854	2031	2216	2410	2610	2816
1979 AUG 15.0	790	800	818	842	873	928	985	1015	1069	1132	1202	1279	1363	1454	1551	1655	1766	1882	2004	2131	2263
JD 2444090.5	422	450	489	539	603	848	752	842	943	1054	1176	1308	1450	1603	1765	1936	2117	2306	2502	2705	2914
1979 AUG 5.0	794	809	831	859	894	1085	992	1044	1105	1172	1247	1328	1417	1512	1614	1722	1836	1957	2082	2213	2348
JD 2444080.5	435	469	514	569	643	711	796	892	998	1114	1241	1377	1524	1680	1847	2022	2206	2399	2598	2804	3014
1979 JUL 26.0	799	818	845	877	917	968	1018	1077	1142	1215	1294	1380	1473	1572	1678	1791	1909	2034	2163	2297	2436

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E07

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)
JD 2444200.5	1472	1338	1249	1196	1173	1178	1207	1261	1341	1467	1920	2346	1860	1971	2136	2326	2536	2764	3010	3271	3547
1979 NOV 23.0	2820	2721	2624	2526	2430	2333	2237	2142	2047	1952	1858	1757	1663	1568	1472	1376	1279	1182	1084	985	886
JD 2444190.5	1407	1296	1225	1187	1178	1194	1234	1298	1393	1572	4813	1879	1899	2044	2221	2421	2639	2874	3126	3394	3676
1979 NOV 13.0	2774	2675	2577	2480	2383	2287	2191	2096	2000	1906	1818	1712	1617	1522	1426	1330	1233	1135	1038	939	840
JD 2444180.5	1352	1262	1208	1185	1188	1215	1265	1341	1457	1830	2319	1848	1961	2125	2313	2520	2746	2989	3248	3522	3811
1979 NOV 3.0	2727	2628	2531	2433	2337	2240	2144	2049	1954	1860	1759	1666	1571	1475	1379	1283	1186	1089	991	892	793
JD 2444170.5	1307	1236	1198	1187	1202	1240	1302	1391	1549	4380	1853	1890	2036	2212	2409	2625	2858	3108	3375	3656	3951
1979 OCT 24.0	2679	2581	2483	2386	2289	2193	2097	2002	1907	1818	1714	1619	1524	1428	1332	1236	1139	1041	944	845	746
JD 2444160.5	1270	1216	1193	1196	1222	1271	1343	1450	1761	2194	1835	1955	2119	2305	2511	2735	2976	3233	3506	3794	4096
1979 OCT 14.0	2631	2533	2435	2338	2241	2145	2049	1954	1859	1760	1666	1571	1476	1380	1284	1188	1091	993	896	797	698
JD 2444150.5	1241	1204	1195	1210	1247	1306	1390	1530	4341	1818	1883	2032	2208	2404	2619	2850	3099	3363	3644	3938	4246
1979 OCT 4.0	2583	2484	2387	2289	2193	2096	2000	1905	1815	1713	1618	1523	1427	1331	1235	1139	1042	945	847	748	649
JD 2444140.5	1220	1198	1202	1229	1277	1346	1446	1704	2003	1823	1953	2118	2304	2509	2731	2971	3227	3499	3786	4088	4402
1979 SEP 24.0	2533	2435	2337	2240	2143	2047	1951	1856	1758	1664	1569	1473	1378	1282	1186	1090	993	895	797	699	600
JD 2444130.5	1206	1198	1215	1253	1311	1392	1516	5060	1782	1880	2034	2210	2406	2619	2849	3097	3361	3640	3935	4243	4563
1979 SEP 14.0	2483	2385	2287	2190	2093	1997	1901	1811	1709	1614	1518	1423	1328	1232	1136	1039	942	845	747	649	550
JD 2444120.5	1199	1205	1233	1282	1350	1443	1654	1824	1814	1955	2122	2308	2513	2734	2973	3229	3500	3787	4089	4403	4729
1979 SEP 4.0	2432	2334	2236	2139	2042	1946	1850	1753	1658	1563	1467	1372	1277	1181	1085	988	891	794	696	598	499
JD 2444110.5	1198	1217	1257	1316	1394	1504	5637	1756	1881	2039	2216	2412	2625	2855	3103	3366	3646	3940	4248	4569	4901
1979 AUG 25.0	2380	2282	2184	2087	1990	1894	1793	1702	1606	1511	1416	1320	1225	1129	1033	936	840	742	644	546	447
JD 2444100.5	1204	1235	1285	1354	1443	1606	1716	1811	1960	2130	2317	2522	2743	2982	3238	3509	3797	4098	4414	4741	5079
1979 AUG 15.0	2327	2229	2131	2034	1937	1841	1745	1649	1554	1458	1363	1267	1172	1076	980	884	787	689	591	493	394
JD 2444090.5	1216	1258	1319	1398	1497	1933	1745	1886	2047	2227	2423	2637	2867	3115	3378	3658	3953	4262	4585	4918	5262
1979 AUG 5.0	2274	2175	2078	1980	1883	1787	1691	1595	1500	1404	1309	1214	1118	1022	926	830	733	636	538	439	340
JD 2444080.5	1234	1287	1358	1446	1559	1680	1814	1969	2140	2329	2535	2757	2997	3253	3525	3813	4116	4432	4761	5101	5450
1979 JUL 26.0	2219	2121	2023	1926	1829	1732	1636	1541	1445	1350	1254	1159	1064	968	872	775	678	581	483	385	286
(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)

JD2443600.5	JD2443640.5	JD2443680.5	JD2443720.5	JD2443760.5
1978 APR 2.0	1978 MAY 12.0	1978 JUN 21.0	1978 JUL 31.0	1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

M15
E08

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444000.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671785	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.585	DEGREES
MEAN ANOM. AT EPOCH	=	121.664	DEGREES
DATE OF NODAL PASSAGE	=	2444140.135	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444000.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338636	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.398	DEGREES
ARG. OF PERIHELION	=	286.281	DEGREES
MEAN ANOM. AT EPOCH	=	25.912	DEGREES
DATE OF NODAL PASSAGE	=	2444072.532	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.058	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E08

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD 2444200.5	850	917	986	1056	1127	1199	1271	1343	1414	1383	1140	941	798	702	638	595	569	553	547	547	553
1979 NOV 23.0	613	650	689	729	770	813	856	900	945	884	702	543	422	333	271	232	215	217	234	262	297
JD 2444190.5	876	944	1013	1084	1156	1228	1301	1373	0	1265	1037	866	748	670	619	587	568	559	558	564	575
1979 NOV 13.0	633	671	710	751	793	837	881	925	0	803	626	484	379	303	254	227	221	233	257	291	331
JD 2444180.5	903	972	1042	1113	1186	1258	1331	1403	1395	1149	946	803	708	646	606	583	572	569	574	585	603
1979 NOV 3.0	654	693	733	775	818	862	906	951	907	720	557	432	342	280	243	228	234	254	286	325	371
JD 2444170.5	931	1000	1071	1143	1216	1289	1362	1434	1272	1041	868	751	675	628	599	584	579	583	594	611	635
1979 OCT 24.0	676	716	757	799	843	887	933	978	822	641	494	387	312	263	239	237	253	281	319	364	415
JD 2444160.5	959	1029	1101	1174	1247	1320	1393	1400	1151	945	802	709	651	616	596	589	592	602	619	643	674
1979 OCT 14.0	699	739	781	825	869	914	960	927	735	567	440	349	288	254	243	253	278	313	358	409	466
JD 2444150.5	988	1059	1132	1205	1278	1352	1425	1272	1037	864	749	677	634	609	599	599	609	625	649	681	720
1979 OCT 4.0	722	764	807	851	896	942	988	838	650	501	393	318	273	253	255	275	309	351	402	460	525
JD 2444140.5	1019	1090	1163	1237	1311	1384	1397	1144	937	797	708	654	623	609	607	615	631	655	686	726	775
1979 SEP 24.0	747	789	833	878	924	970	943	745	572	443	354	296	266	260	275	305	346	396	453	518	592
JD 2444130.5	1049	1122	1195	1269	1343	1417	1262	1025	853	743	676	638	619	614	620	635	659	691	731	780	840
1979 SEP 14.0	772	816	860	906	953	999	847	654	503	395	324	283	269	277	302	341	389	446	512	586	670
JD 2444120.5	1081	1154	1228	1302	1377	1385	1127	922	786	702	654	629	621	625	639	662	694	734	784	845	919
1979 SEP 4.0	799	843	889	935	982	953	748	572	443	357	304	280	280	301	337	384	440	505	579	664	761
JD 2444110.5	1114	1187	1262	1336	1411	1242	1004	837	733	673	641	628	629	642	664	696	736	787	849	923	1014
1979 AUG 25.0	826	871	918	965	1013	849	651	499	395	329	294	287	302	334	379	434	499	573	658	756	869
JD 2444100.5	1147	1221	1296	1371	1362	1101	899	770	695	654	636	634	644	666	697	737	788	850	926	1019	1131
1979 AUG 15.0	854	900	948	996	954	742	564	439	358	312	296	305	332	375	429	493	567	652	750	864	999
JD 2444090.5	1182	1256	1332	1407	1210	974	815	720	669	644	638	647	666	697	737	788	851	928	1021	1135	1277
1979 AUG 5.0	883	930	979	1027	841	639	490	392	333	308	309	333	372	424	487	561	646	744	859	994	1158
JD 2444080.5	1217	1292	1368	1327	1063	869	751	686	655	643	649	667	696	736	787	850	928	1022	1137	1281	1461
1979 JUL 26.0	913	961	1010	946	725	550	431	358	322	316	334	370	420	482	555	640	739	854	990	1154	1356
(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)

JD2443800.5 1978 OCT 19.0 | JD2443840.5 1978 NOV 28.0 | JD2443880.5 1979 JAN 7.0 | JD2443920.5 1979 FEB 16.0 | JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E08

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD 2444200.5	53	77	102	126	148	169	188	205	218	-102	-98	-86	-66	-40	-11	18	48	77	104	128	149
1979 NOV 23.0	84	148	213	278	346	414	484	555	627	3415	3431	3464	3513	3573	40	110	182	257	333	411	490
JD 2444190.5	46	71	96	120	143	164	183	200	0	-117	-110	-93	-70	-43	-13	17	48	77	105	129	150
1979 NOV 13.0	71	135	199	265	331	399	469	539	0	3378	3402	3444	3500	3565	34	105	178	253	330	408	487
JD 2444180.5	38	64	89	114	137	159	179	196	-133	-130	-119	-99	-73	-44	-13	17	48	78	105	130	151
1979 NOV 3.0	58	121	185	251	317	384	453	523	3329	3344	3377	3428	3490	3557	28	101	175	250	327	404	484
JD 2444170.5	31	57	82	107	131	153	174	192	-147	-141	-125	-103	-75	-45	-13	18	49	79	106	131	151
1979 OCT 24.0	44	108	172	236	302	369	437	506	3290	3313	3357	3415	3481	3551	23	96	171	246	323	401	480
JD 2444160.5	24	50	75	101	125	147	168	-162	-159	-149	-130	-105	-76	-45	-13	18	49	79	107	131	152
1979 OCT 14.0	31	94	157	222	287	353	420	3239	3253	3287	3340	3404	3473	3545	18	92	167	243	319	397	476
JD 2444150.5	16	43	68	94	118	141	162	-174	-169	-154	-133	-106	-76	-45	-13	19	50	80	107	132	153
1979 OCT 4.0	17	80	143	207	271	337	404	3197	3220	3266	3326	3394	3466	3540	14	88	163	239	315	393	472
JD 2444140.5	9	35	61	87	112	135	-187	-185	-176	-158	-134	-107	-76	-45	-12	19	51	80	108	133	153
1979 SEP 24.0	2	65	128	191	256	321	3144	3157	3193	3248	3315	3387	3461	3535	9	84	159	234	310	388	467
JD 2444130.5	1	28	54	80	105	128	-198	-193	-180	-160	-135	-107	-76	-44	-12	20	51	81	108	133	154
1979 SEP 14.0	3588	50	113	176	239	304	3099	3123	3171	3234	3306	3380	3455	3530	4	79	154	229	305	383	461
JD 2444120.5	-6	20	46	72	97	-208	-206	-198	-182	-161	-135	-106	-76	-44	-11	20	51	81	109	133	154
1979 SEP 4.0	3573	35	97	160	223	3043	3057	3094	3153	3223	3298	3374	3449	3525	3599	74	148	224	300	377	455
JD 2444110.5	-13	12	38	64	90	-216	-212	-201	-183	-161	-135	-106	-75	-43	-11	20	51	81	109	134	154
1979 AUG 25.0	3557	19	81	143	206	2995	3021	3072	3140	3214	3291	3368	3444	3519	3594	68	143	218	293	370	448
JD 2444100.5	-21	4	30	57	-223	-222	-215	-202	-183	-160	-134	-105	-75	-43	-11	20	51	81	109	134	154
1979 AUG 15.0	3541	3	64	126	2937	2951	2992	3055	3129	3207	3285	3362	3438	3513	3588	62	136	211	287	363	440
JD 2444090.5	-30	-3	22	48	-228	-224	-216	-202	-183	-160	-134	-105	-75	-43	-11	20	51	81	109	134	154
1979 AUG 5.0	3525	3586	47	109	2886	2914	2970	3042	3120	3199	3278	3356	3432	3507	3582	56	130	204	279	355	432
JD 2444080.5	-38	-12	14	-231	-230	-225	-215	-201	-182	159	-133	-105	-75	-44	-12	19	50	81	109	134	155
1979 JUL 26.0	3508	3569	30	2826	2841	2887	2954	3032	3112	3192	3271	3349	3425	3500	3575	49	122	196	271	346	422

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)

JD2443800.5 1978 OCT 19.0 | JD2443840.5 1978 NOV 28.0 | JD2443880.5 1979 JAN 7.0 | JD2443920.5 1979 FEB 16.0 | JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

M15
E08

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

	(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD 2444200.5		183	192	200	207	214	221	227	232	236	214	204	199	199	201	201	192	168	133	96	62	35
1979 NOV 23.0		503	526	550	576	603	631	661	691	723	782	735	727	759	829	937	1079	1241	1398	1530	1634	1714
JD 2444190.5		174	183	191	199	207	214	221	226	0	204	196	193	196	200	199	186	159	124	90	61	38
1979 NOV 13.0		466	489	514	540	567	595	625	656	0	709	681	694	747	838	966	1123	1286	1431	1548	1638	1708
JD 2444180.5		164	173	182	191	199	207	214	220	206	193	187	189	194	199	196	179	150	118	88	63	43
1979 NOV 3.0		430	453	478	504	531	560	590	621	691	644	638	672	746	859	1006	1171	1327	1456	1558	1636	1697
JD 2444170.5		153	163	172	181	190	198	206	214	192	182	180	186	194	199	193	172	143	114	88	67	50
1979 OCT 24.0		394	418	442	469	496	525	555	586	617	590	606	663	759	893	1053	1216	1359	1472	1560	1628	1682
JD 2444160.5		141	151	161	171	180	190	198	193	177	171	174	184	195	198	188	166	139	113	91	73	58
1979 OCT 14.0		359	382	407	434	461	490	520	599	553	549	587	667	785	937	1102	1256	1382	1480	1555	1615	1663
JD 2444150.5		129	140	150	160	170	180	189	175	163	162	172	186	197	197	184	161	137	115	96	80	67
1979 OCT 4.0		323	347	372	399	426	455	486	524	500	520	582	684	823	986	1148	1286	1396	1480	1545	1598	1641
JD 2444140.5		117	128	138	149	160	170	175	157	151	157	172	189	199	196	180	159	137	119	102	89	78
1979 SEP 24.0		288	312	338	364	392	421	504	460	460	505	590	715	871	1036	1185	1306	1400	1473	1530	1577	1617
JD 2444130.5		104	115	126	137	148	159	153	140	142	155	175	193	200	194	178	159	140	124	110	99	89
1979 SEP 14.0		253	278	303	330	358	388	430	409	435	504	614	759	922	1080	1213	1317	1397	1460	1511	1553	1590
JD 2444120.5		90	102	113	125	137	151	131	127	137	158	181	198	201	192	177	161	145	131	119	109	101
1979 SEP 4.0		219	243	269	296	324	408	367	373	425	519	651	809	971	1114	1229	1318	1388	1443	1488	1527	1560
JD 2444110.5		76	88	100	112	125	125	113	119	138	164	189	202	202	192	178	164	151	139	129	120	113
1979 AUG 25.0		184	209	235	262	291	334	319	353	431	549	699	862	1012	1137	1235	1312	1372	1421	1462	1497	1529
JD 2444100.5		62	74	87	99	121	102	100	116	144	174	197	206	203	193	181	170	158	148	139	131	125
1979 AUG 15.0		150	175	201	229	309	273	288	350	454	593	752	908	1042	1149	1233	1298	1351	1395	1432	1465	1495
JD 2444090.5		47	60	73	86	93	84	94	120	154	185	203	209	204	196	186	176	166	158	150	142	137
1979 AUG 5.0		115	141	168	196	237	230	275	365	492	645	803	944	1060	1151	1222	1279	1326	1366	1400	1431	1460
JD 2444080.5		32	45	59	87	69	73	96	130	167	195	209	211	207	199	191	183	175	167	160	153	148
1979 JUL 26.0		81	107	135	208	180	206	281	397	542	698	845	968	1066	1143	1205	1255	1297	1334	1366	1395	1423
	(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)

JD2443800.5 1978 OCT 19.0 | JD2443840.5 1978 NOV 28.0 | JD2443880.5 1979 JAN 7.0 | JD2443920.5 1979 FEB 16.0 | JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E08

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD 2444200.5 1979 NOV 23.0	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311
JD 2444190.5 1979 NOV 13.0	1398	1398	1398	1398	1398	1398	1398	1398	0	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398
JD 2444180.5 1979 NOV 3.0	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482
JD 2444170.5 1979 OCT 24.0	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562
JD 2444160.5 1979 OCT 14.0	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638
JD 2444150.5 1979 OCT 4.0	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710
JD 2444140.5 1979 SEP 24.0	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777
JD 2444130.5 1979 SEP 14.0	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840
JD 2444120.5 1979 SEP 4.0	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897
JD 2444110.5 1979 AUG 25.0	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
JD 2444100.5 1979 AUG 15.0	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998
JD 2444090.5 1979 AUG 5.0	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041
JD 2444080.5 1979 JUL 26.0	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)

JD2443800.5 1978 OCT 19.0 | JD2443840.5 1978 NOV 28.0 | JD2443880.5 1979 JAN 7.0 | JD2443920.5 1979 FEB 16.0 | JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E08

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD 2444200.5	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375
1979 NOV 23.0	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887
JD 2444190.5	375	375	375	375	375	375	375	375	0	375	375	375	375	375	375	375	375	375	375	375	375
1979 NOV 13.0	832	832	832	632	832	832	832	832	0	832	832	832	832	832	832	832	832	832	832	832	832
JD 2444180.5	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372
1979 NOV 3.0	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781
JD 2444170.5	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367
1979 OCT 24.0	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734
JD 2444160.5	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360
1979 OCT 14.0	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690
JD 2444150.5	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352
1979 OCT 4.0	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648
JD 2444140.5	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342
1979 SEP 24.0	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609
JD 2444130.5	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331
1979 SEP 14.0	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572
JD 2444120.5	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320
1979 SEP 4.0	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537
JD 2444110.5	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308
1979 AUG 25.0	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505
JD 2444100.5	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296
1979 AUG 15.0	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473
JD 2444090.5	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283
1979 AUG 5.0	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444
JD 2444080.5	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270
1979 JUL 26.0	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)

JD2443800.5 1978 OCT 19.0 | JD2443840.5 1978 NOV 28.0 | JD2443880.5 1979 JAN 7.0 | JD2443920.5 1979 FEB 16.0 | JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E09

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
JD 2444200.5	1876	2014	2180	2375	2601	2866	3209	5788	3957	4312	4813	5416	6146	7045	8195	0	0	0	0	0	0
1979 NOV 23.0	2480	2384	2288	2192	2097	2001	1907	1819	1713	1618	1523	1427	1330	1233	1135	0	0	0	0	0	0
JD 2444190.5	2025	2193	2391	2623	2892	3213	3725	4398	4437	4957	5600	6382	7351	8591	0	0	0	0	0	0	0
1979 NOV 13.0	2434	2338	2242	2146	2050	1955	1861	1760	1667	1572	1476	1380	1284	1187	0	0	0	0	0	0	0
JD 2444180.5	2201	2403	2639	2913	3234	3633	5700	4575	5084	5760	6592	7626	8953	0	0	0	0	0	0	0	0
1979 NOV 3.0	2388	2291	2195	2099	2004	1909	1820	1716	1621	1526	1430	1334	1237	0	0	0	0	0	0	0	0
JD 2444170.5	2409	2649	2928	3254	3641	4190	4935	5197	5899	6776	7871	9279	0	0	0	0	0	0	0	0	0
1979 OCT 24.0	2340	2244	2148	2052	1956	1862	1762	1669	1574	1478	1383	1286	0	0	0	0	0	0	0	0	0
JD 2444160.5	2653	2937	3269	3658	4132	5991	5312	6018	6934	8085	9570	0	0	0	0	0	0	0	0	0	0
1979 OCT 14.0	2292	2196	2100	2004	1909	1818	1716	1621	1526	1430	1335	0	0	0	0	0	0	0	0	0	0
JD 2444150.5	2941	3278	3673	4142	4761	5554	6120	7068	8269	9825	0	0	0	0	0	0	0	0	0	0	0
1979 OCT 4.0	2243	2147	2051	1955	1860	1762	1668	1573	1477	1382	0	0	0	0	0	0	0	0	0	0	0
JD 2444140.5	3280	3681	4155	4726	6676	6213	7179	8426	9999	0	0	0	0	0	0	0	0	0	0	0	9999
1979 SEP 24.0	2194	2097	2001	1906	1815	1714	1619	1523	1428	0	0	0	0	0	0	0	0	0	0	0	3348
JD 2444130.5	3683	4164	4735	5466	6348	7271	8557	9999	0	0	0	0	0	0	0	0	0	0	0	9999	8983
1979 SEP 14.0	2144	2047	1951	1856	1758	1664	1569	1473	0	0	0	0	0	0	0	0	0	0	0	3298	3398
JD 2444120.5	4166	4744	5446	8157	7346	8663	9999	0	0	0	0	0	0	0	0	0	0	0	9999	8902	7507
1979 SEP 4.0	2093	1996	1900	1809	1708	1613	1518	0	0	0	0	0	0	0	0	0	0	0	3248	3349	3449
JD 2444110.5	4748	5454	6342	7419	8748	9999	0	0	0	0	0	0	0	0	0	0	0	9999	8828	7406	6477
1979 AUG 25.0	2041	1944	1848	1752	1656	1561	0	0	0	0	0	0	0	0	0	0	0	3200	3300	3401	3501
JD 2444100.5	5457	6335	8411	8812	9999	0	0	0	0	0	0	0	0	0	0	0	0	9999	8760	7315	6343	5815
1979 AUG 15.0	1988	1891	1793	1699	1604	0	0	0	0	0	0	0	0	0	0	0	0	3154	3253	3353	3453	3554
JD 2444090.5	6341	7453	8861	9999	0	0	0	0	0	0	0	0	0	0	0	0	9999	8696	7233	6223	5635	4670
1979 AUG 5.0	1934	1838	1741	1646	0	0	0	0	0	0	0	0	0	0	0	0	3109	3208	3307	3407	3507	9
JD 2444080.5	7457	8900	9999	0	0	0	0	0	0	0	0	0	0	0	0	9999	8636	7159	6117	5473	5254	4365
1979 JUL 26.0	1880	1783	1687	0	0	0	0	0	0	0	0	0	0	0	0	3065	3164	3262	3362	3461	3562	63

(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

M15
E10

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444240.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671758	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.597	DEGREES
MEAN ANOM. AT EPOCH	=	358.208	DEGREES
DATE OF NODAL PASSAGE	=	2444140.125	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444240.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338698	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.403	DEGREES
ARG. OF PERIHELION	=	286.288	DEGREES
MEAN ANOM. AT EPOCH	=	151.677	DEGREES
DATE OF NODAL PASSAGE	=	2444072.525	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.061	DEGREES

M15
E10

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

MARS ARRIVAL OR DEPARTURE DATE	(FLT T)(0)(10)(20)(30)(40)(50)(60)(70)(80)(90)(100)(110)(120)(130)(140)(150)(160)(170)(180)(190)(200)
JD 2444200.5	0 0 0 0 0 0 1253 1044 878 740 624 525 439 365 302 250 207 175 153 142 143
1979 NOV 23.0	0 0 0 0 0 0 761 590 468 381 319 278 251 235 227 222 219 217 214 211 207
JD 2444190.5	0 0 0 0 0 1366 1147 973 829 706 601 509 428 359 298 247 205 172 150 138 138
1979 NOV 13.0	0 0 0 0 0 842 654 517 415 340 285 247 222 208 200 196 193 192 190 188 186
JD 2444180.5	0 0 0 0 2316 1249 1067 917 789 678 580 494 419 353 295 245 204 171 148 136 136
1979 NOV 3.0	0 0 0 0 2091 728 577 463 376 309 259 224 200 185 177 173 171 170 169 168 167
JD 2444170.5	0 0 0 2297 1347 1160 1004 871 755 653 562 482 410 347 291 243 203 170 147 135 138
1979 OCT 24.0	0 0 0 2081 808 646 521 423 346 286 240 206 182 167 158 154 152 151 151 150 151
JD 2444160.5	0 0 2279 1978 1249 1089 952 832 726 631 546 470 402 341 288 242 202 170 147 135 144
1979 OCT 14.0	0 0 2072 1711 719 585 479 393 324 269 225 192 169 153 143 138 136 135 135 135 139
JD 2444150.5	0 2261 1955 1335 1171 1030 907 798 700 611 531 459 394 336 284 239 201 169 146 137 160
1979 OCT 4.0	0 2063 1699 795 654 540 448 371 308 257 215 183 159 143 132 126 123 121 121 122 134
JD 2444140.5	2243 1933 1739 1249 1106 981 868 767 675 592 516 448 386 330 281 237 199 169 147 141 216
1979 SEP 24.0	2056 1689 1431 724 605 506 424 355 297 248 209 177 153 135 124 116 112 110 110 112 156
JD 2444130.5	1912 1711 1324 1179 1052 937 833 739 653 574 502 437 377 324 276 234 198 168 147 152 790
1979 SEP 14.0	1681 1418 796 671 567 480 406 342 288 243 205 174 149 131 118 110 104 101 101 109 559
JD 2444120.5	1684 1567 1248 1119 1003 898 802 713 631 557 488 426 369 318 272 231 195 166 148 193 226
1979 SEP 4.0	1407 1224 738 630 539 460 392 333 283 239 203 173 148 129 115 106 99 95 95 128 190
JD 2444110.5	1533 1314 1184 1067 960 862 772 688 611 540 474 415 360 311 266 227 192 165 152 1181 129
1979 AUG 25.0	1207 805 694 598 516 444 382 327 279 238 202 173 149 130 115 104 97 92 93 854 115
JD 2444100.5	1443 1245 1127 1020 921 829 743 664 591 523 461 403 351 304 261 222 189 162 174 154 112
1979 AUG 15.0	1071 757 658 573 498 432 373 322 277 237 203 175 151 131 116 105 96 90 104 130 97
JD 2444090.5	1302 1184 1076 977 884 797 716 641 571 507 447 392 342 296 255 217 185 160 411 120 107
1979 AUG 5.0	819 718 630 553 483 422 367 318 275 238 205 177 154 135 119 107 98 91 328 97 91
JD 2444080.5	1238 1130 1030 937 849 767 690 619 552 490 433 380 332 288 248 212 180 159 132 114 105
1979 JUL 26.0	777 687 607 536 471 414 362 316 275 239 207 180 158 139 123 111 102 94 99 92 90
(FLT T)	(120)(130)(140)(150)(160)(170)(180)(190)(200)(210)(220)(230)(240)(250)(260)(270)(280)(290)(300)(310)(320)

JD2444200.5
1979 NOV 23.0

JD2444240.5
1980 JAN 2.0

JD2444280.5
1980 FEB 11.0

JD2444320.5
1980 MAR 22.0

JD2444360.5
1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E10

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
JD 2444200.5	0	0	0	0	0	0	-94	-83	-70	-58	-46	-36	-28	-24	-26	-37	-59	-95	-146	-207	-274
1979 NOV 23.0	0	0	0	0	0	0	3433	3465	3499	3534	3570	5	37	65	87	99	98	81	47	3	3562
JD 2444190.5	0	0	0	0	0	-110	-98	-85	-72	-58	-45	-33	-24	-18	-18	-27	-47	-82	-135	-204	-286
1979 NOV 13.0	0	0	0	0	0	3386	3418	3454	3491	3529	3568	6	42	74	100	117	123	113	87	49	13
JD 2444180.5	0	0	0	0	228	-116	-103	-88	-74	-59	-44	-31	-20	-14	-12	-19	-37	-71	-126	-202	-302
1979 NOV 3.0	0	0	0	0	739	3367	3403	3441	3482	3523	3564	5	43	79	108	131	142	139	120	90	64
JD 2444170.5	0	0	0	214	-134	-121	-107	-92	-76	-60	-44	-30	-18	-10	-7	-12	-29	-63	-119	-205	-327
1979 OCT 24.0	0	0	0	635	3311	3347	3387	3429	3472	3515	3559	2	43	81	114	140	156	159	148	127	116
JD 2444160.5	0	0	193	205	-140	-127	-112	-95	-79	-62	-45	-30	-17	-8	-4	-8	-23	-57	-116	-214	-367
1979 OCT 14.0	0	0	534	583	3288	3328	3371	3415	3461	3507	3553	3598	41	81	117	146	166	174	170	160	175
JD 2444150.5	0	168	182	-159	-147	-132	-116	-99	-82	-64	-46	-30	-16	-6	-1	-4	-19	-53	-117	-231	-433
1979 OCT 4.0	0	436	485	3225	3265	3309	3354	3401	3449	3497	3545	3592	37	79	117	149	172	185	188	191	256
JD 2444140.5	138	155	169	-166	-152	-137	-121	-103	-85	-66	-48	-31	-16	-5	0	-1	-15	-51	-122	-263	-544
1979 SEP 24.0	341	390	435	3199	3243	3290	3338	3387	3437	3487	3537	3585	31	75	115	149	175	192	202	226	423
JD 2444130.5	123	140	-184	-172	-158	-142	-125	-107	-88	-68	-50	-32	-16	-4	2	1	-13	-51	-134	-323	-584
1979 SEP 14.0	298	343	3130	3175	3222	3271	3322	3373	3425	3477	3527	3577	25	70	111	146	175	196	214	274	1184
JD 2444120.5	108	123	-189	-177	-163	-146	-129	-110	-91	-71	-51	-33	-17	-3	3	3	-11	-52	-156	-448	595
1979 SEP 4.0	254	296	3102	3151	3201	3253	3306	3359	3412	3465	3517	3568	17	63	105	142	172	196	227	392	3199
JD 2444110.5	91	-205	-194	-182	-167	-151	-133	-114	-94	-73	-53	-34	-17	-3	5	5	-9	-56	-199	-443	340
1979 AUG 25.0	210	3027	3076	3128	3181	3235	3290	3345	3399	3454	3507	3559	8	55	98	135	167	195	248	1298	3468
JD 2444100.5	73	-209	-199	-186	-171	-155	-137	-117	-97	-76	-55	-35	-17	-2	7	8	-6	-63	-319	428	186
1979 AUG 15.0	166	2999	3051	3105	3160	3217	3273	3330	3386	3442	3496	3548	3598	45	88	126	158	191	317	3482	3545
JD 2444090.5	-221	-213	-202	-190	-175	-159	-140	-120	-99	-78	-57	-36	-17	-1	10	13	-0	-73	735	181	93
1979 AUG 5.0	2919	2971	3026	3083	3141	3199	3257	3315	3373	3429	3484	3537	3587	34	77	114	145	185	3025	9	3574
JD 2444080.5	-223	-215	-206	-193	-179	-162	-143	-123	-102	-80	-58	-36	-16	1	15	22	13	-103	143	71	30
1979 JUL 26.0	2889	2945	3003	3062	3121	3181	3241	3300	3359	3416	3471	3524	3575	21	63	98	126	185	58	40	3582

(FLT T)	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E10

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
JD 2444200.5	0	0	0	0	0	0	214	209	204	198	190	182	172	164	158	155	156	161	170	185	210
1979 NOV 23.0	0	0	0	0	0	0	805	805	790	759	712	654	592	534	484	445	417	398	386	380	376
JD 2444190.5	0	0	0	0	0	217	214	209	204	198	191	182	173	164	157	153	154	159	170	189	220
1979 NOV 13.0	0	0	0	0	0	806	821	824	811	782	736	678	613	550	494	450	417	393	378	368	360
JD 2444180.5	0	0	0	0	144	218	214	210	204	198	191	183	174	165	157	153	153	159	172	196	238
1979 NOV 3.0	0	0	0	0	348	820	838	842	832	806	762	705	638	571	510	460	421	393	373	359	346
JD 2444170.5	0	0	0	127	221	218	214	210	204	198	191	184	175	166	158	154	154	161	177	208	267
1979 OCT 24.0	0	0	0	301	805	834	853	860	853	829	790	734	668	598	532	476	431	398	373	353	332
JD 2444160.5	0	0	109	130	222	219	214	209	204	198	191	184	176	167	160	155	156	165	186	227	317
1979 OCT 14.0	0	0	253	306	817	847	867	875	871	851	816	764	700	629	560	499	448	409	378	351	317
JD 2444150.5	0	89	111	224	222	219	214	209	204	198	191	184	176	168	161	157	160	171	198	257	406
1979 OCT 4.0	0	205	257	789	827	857	878	888	886	871	840	793	733	664	593	528	472	427	389	353	290
JD 2444140.5	69	91	116	224	222	219	214	209	203	197	191	184	176	169	163	160	164	180	217	307	574
1979 SEP 24.0	158	208	270	796	834	864	885	897	897	885	860	819	764	699	630	563	503	452	408	357	210
JD 2444130.5	70	95	225	224	222	219	214	209	203	197	190	183	176	169	163	162	168	190	244	395	795
1979 SEP 14.0	158	218	758	801	838	867	889	901	904	896	874	840	792	733	668	602	540	485	432	353	219
JD 2444120.5	73	104	225	224	222	219	214	209	203	196	189	182	174	168	163	162	171	201	283	571	-350
1979 SEP 4.0	166	239	760	802	837	866	888	901	906	900	884	855	814	763	704	642	581	524	461	294	659
JD 2444110.5	81	223	225	224	222	219	214	208	202	195	188	180	173	166	161	161	173	212	350	721	-184
1979 AUG 25.0	185	714	759	799	833	861	883	897	903	900	887	864	830	786	735	679	623	567	488	429	610
JD 2444100.5	94	223	224	224	222	218	214	208	202	195	187	179	170	162	157	157	170	224	511	-242	-79
1979 AUG 15.0	214	711	754	792	825	852	873	888	895	894	885	867	839	803	759	712	662	608	475	665	617
JD 2444090.5	219	222	223	223	221	218	213	207	201	193	185	176	167	158	150	148	161	237	-406	-63	-9
1979 AUG 5.0	659	704	745	781	812	839	859	874	[illegible]	883	877	863	841	812	777	737	695	644	741	655	641
JD 2444080.5	217	221	222	222	220	217	212	206	200	192	183	173	163	151	141	134	140	269	-18	28	40
1979 JUL 26.0	650	693	732	766	796	821	841	856	865	868	864	854	837	814	785	754	720	669	691	671	667

(FLT T)	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E10

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)
JD 2444200.5 1979 NOV 23.0	0	0	0	0	0	0	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311
JD 2444190.5 1979 NOV 13.0	0	0	0	0	0	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398
JD 2444180.5 1979 NOV 3.0	0	0	0	0	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482
JD 2444170.5 1979 OCT 24.0	0	0	0	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562
JD 2444160.5 1979 OCT 14.0	0	0	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638
JD 2444150.5 1979 OCT 4.0	0	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710
JD 2444140.5 1979 SEP 24.0	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777
JD 2444130.5 1979 SEP 14.0	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840
JD 2444120.5 1979 SEP 4.0	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897
JD 2444110.5 1979 AUG 25.0	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
JD 2444100.5 1979 AUG 15.0	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998
JD 2444090.5 1979 AUG 5.0	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041
JD 2444080.5 1979 JUL 26.0	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E10

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
JD 2444200.5	0	0	0	0	0	0	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375
1979 NOV 23.0	0	0	0	0	0	0	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887
JD 2444190.5	0	0	0	0	0	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375
1979 NOV 13.0	0	0	0	0	0	832	832	832	832	832	832	832	832	832	832	832	832	832	832	832	832
JD 2444180.5	0	0	0	0	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372
1979 NOV 3.0	0	0	0	0	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781
JD 2444170.5	0	0	0	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367
1979 OCT 24.0	0	0	0	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734
JD 2444160.5	0	0	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360
1979 OCT 14.0	0	0	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690
JD 2444150.5	0	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352
1979 OCT 4.0	0	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648
JD 2444140.5	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342
1979 SEP 24.0	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609
JD 2444130.5	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331
1979 SEP 14.0	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572
JD 2444120.5	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320
1979 SEP 4.0	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537
JD 2444110.5	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308
1979 AUG 25.0	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505
JD 2444100.5	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296
1979 AUG 15.0	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473
JD 2444090.5	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283
1979 AUG 5.0	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444
JD 2444080.5	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270
1979 JUL 26.0	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416

(FLT T)	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

N15
E10.

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)
JD 2444200.5	0	0	0	0	0	0	74	175	276	376	477	577	676	775	874	971	1069	1165	1262	1358	1453
1979 NOV 23.0	0	0	0	0	0	0	-1751	-1719	-1698	-1678	-1654	-1623	-1585	-1542	-1499	-1460	-1430	-1409	-1401	-1402	-1412
JD 2444190.5	0	0	0	0	0	23	119	221	322	423	523	623	723	821	920	1018	1115	1212	1308	1404	1499
1979 NOV 13.0	0	0	0	0	0	-1785	-1753	-1737	-1726	-1714	-1697	-1673	-1643	-1608	-1570	-1535	-1505	-1484	-1473	-1472	-1479
JD 2444180.5	0	0	0	0	3558	65	166	267	368	469	570	670	769	868	967	1064	1162	1258	1355	1451	1546
1979 NOV 3.0	0	0	0	0	-1779	-1777	-1762	-1757	-1753	-1747	-1737	-1720	-1696	-1667	-1635	-1604	-1576	-1556	-1544	-1540	-1545
JD 2444170.5	0	0	0	3506	17	112	213	314	416	517	617	717	817	916	1014	1112	1209	1306	1402	1498	1593
1979 OCT 24.0	0	0	0	-1754	-1794	-1779	-1777	-1779	-1781	-1779	-1774	-1762	-1744	-1721	-1695	-1668	-1643	-1624	-1612	-1607	-1610
JD 2444160.5	0	0	3452	3553	58	159	261	362	464	565	665	765	865	963	1062	1160	1257	1354	1450	1546	1641
1979 OCT 14.0	0	0	-1729	-1777	-1791	-1789	-1794	1798	1792	1789	1790	1797	-1789	-1771	-1750	-1727	-1706	-1688	-1676	-1671	-1673
JD 2444150.5	0	3400	3501	13	106	208	309	411	512	613	714	814	913	1012	1111	1208	1306	1402	1499	1595	1690
1979 OCT 4.0	0	-1704	-1753	-1797	-1795	1796	1786	1774	1765	1759	1757	1760	1768	1781	1798	-1782	-1764	-1749	-1738	-1732	-1734
JD 2444140.5	3348	3449	3550	54	155	257	359	460	562	663	763	863	963	1062	1160	1258	1355	1452	1548	1644	1739
1979 SEP 24.0	-1679	-1729	-1777	-1798	1793	1780	1765	1751	1739	1730	1725	1724	1729	1738	1750	1765	1780	1793	-1796	-1791	-1792
JD 2444130.5	3398	3499	10	104	205	307	409	511	612	713	813	913	1013	1112	1210	1308	1405	1502	1598	1694	1786
1979 SEP 14.0	-1706	-1754	1800	1793	1779	1761	1743	1727	1712	1701	1693	1690	1691	1697	1706	1717	1729	1740	1748	1752	1749
JD 2444120.5	3449	3550	53	154	256	358	460	562	663	764	864	964	1064	1163	1261	1359	1456	1553	1649	1745	1842
1979 SEP 4.0	-1732	-1778	1795	1781	1762	1741	1721	1702	1686	1673	1663	1657	1655	1658	1663	1671	1680	1689	1695	1698	1699
JD 2444110.5	3501	7	105	206	308	410	512	613	715	816	916	1016	1116	1215	1313	1411	1508	1605	1701	1793	1893
1979 AUG 25.0	-1758	1799	1785	1765	1743	1720	1698	1678	1660	1645	1633	1625	1621	1620	1623	1628	1634	1640	1645	1645	1647
JD 2444100.5	3554	56	157	259	361	463	565	666	768	869	969	1069	1169	1268	1366	1464	1561	1658	1754	1851	1946
1979 AUG 15.0	-1781	1791	1771	1747	1723	1698	1675	1653	1633	1617	1603	1593	1587	1584	1584	1587	1591	1595	1598	1600	1598
JD 2444090.5	9	109	211	313	414	516	618	720	821	922	1023	1123	1222	1321	1420	1517	1615	1712	1809	1904	2000
1979 AUG 5.0	1799	1778	1754	1728	1701	1675	1651	1628	1607	1589	1574	1562	1554	1549	1547	1547	1549	1551	1554	1554	1552
JD 2444080.5	63	164	265	367	469	571	673	775	876	977	1077	1177	1277	1376	1474	1572	1669	1766	1863	1959	2054
1979 JUL 26.0	1787	1762	1735	1707	1679	1652	1626	1602	1580	1561	1545	1532	1522	1515	1511	1509	1509	1510	1511	1510	1508

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E10

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
JD 2444200.5	0	0	0	0	0	0	1308	558	361	274	226	198	181	171	167	168	174	187	207	239	294
1979 NOV 23.0	0	0	0	0	0	0	975	889	779	669	570	486	419	369	333	308	292	281	274	270	267
JD 2444190.5	0	0	0	0	0	4415	776	427	301	238	202	181	168	162	160	163	172	187	211	251	320
1979 NOV 13.0	0	0	0	0	0	998	947	853	747	644	551	472	407	357	321	295	277	266	258	254	251
JD 2444180.5	0	0	0	0	2148	1353	533	338	253	208	181	165	156	152	153	158	169	187	217	265	355
1979 NOV 3.0	0	0	0	0	1000	984	915	820	719	622	534	459	397	349	312	285	267	254	246	242	239
JD 2444170.5	0	0	0	875	5863	740	393	274	215	182	162	150	144	143	146	153	166	188	223	284	405
1979 OCT 24.0	0	0	0	1002	999	951	883	790	693	601	519	448	389	342	305	278	259	246	237	232	229
JD 2444160.5	0	0	520	1634	1316	483	301	224	183	159	144	136	133	133	138	147	163	188	231	309	485
1979 OCT 14.0	0	0	1005	1000	989	934	852	761	669	582	505	438	381	336	300	273	253	239	230	225	222
JD 2444150.5	0	353	705	7384	658	341	235	184	155	138	128	122	121	123	130	141	159	189	241	345	635
1979 OCT 4.0	0	1009	1001	1000	970	905	822	733	646	565	491	428	374	330	295	268	248	234	225	219	216
JD 2444140.5	255	417	1253	1159	405	250	185	151	130	118	112	109	109	113	121	134	155	190	255	403	1027
1979 SEP 24.0	1014	1003	1000	992	947	876	793	708	625	548	478	418	367	325	291	265	245	231	221	215	212
JD 2444130.5	275	544	8174	528	271	186	145	122	108	100	96	95	97	102	111	125	149	191	275	517	4438
1979 SEP 14.0	1005	1000	1000	976	920	846	765	683	604	531	466	409	360	320	287	262	242	228	218	212	208
JD 2444120.5	309	930	873	302	186	137	112	97	88	83	80	81	84	90	99	115	142	192	309	842	1101
1979 SEP 4.0	1000	1000	994	954	892	817	738	659	584	515	454	400	354	315	284	259	240	225	215	209	206
JD 2444110.5	379	6694	358	184	127	99	83	74	68	66	65	66	70	76	86	103	133	195	379	6914	400
1979 AUG 25.0	998	1000	979	930	863	789	712	636	565	500	442	391	347	311	280	256	238	224	214	208	204
JD 2444100.5	609	502	180	112	83	67	58	53	50	49	49	51	55	61	71	88	120	198	609	554	193
1979 AUG 15.0	999	994	959	903	834	761	687	615	547	485	430	382	341	306	277	254	236	222	212	206	203
JD 2444090.5	2159	168	88	61	48	41	36	33	32	32	33	34	38	43	52	67	100	207	2163	176	93
1979 AUG 5.0	1000	980	935	875	806	734	662	593	529	471	419	373	334	301	274	251	234	221	211	205	202
JD 2444080.5	131	51	32	24	20	17	15	15	14	14	15	16	18	21	27	37	63	243	131	52	33
1979 JUL 26.0	993	961	909	846	777	707	638	573	512	457	408	365	328	296	270	249	232	220	211	205	202

(FLT T)	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E10

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

	(FLT T)(0)(10)(20)(30)(40)(50)(60)(70)(80)(90)(100)(110)(120)(130)(140)(150)(160)(170)(180)(190)(200)
JD 2444200.5	0 0 0 0 0 0 -22 -102 -212 -335 -463 -585 -696 -791 -866 -923 -963 -989-1005-1012 1015
1979 NOV 23.0	0 0 0 0 0 0-1841-1750-1711-1696-1691-1695-1704-1716-1731-1745-1757-1764-1765-1761-1752
JD 2444190.5	0 0 0 0 0 -1 -46 -131 -238 -356 -476 -591 -696 -787 -860 -917 -958 -985-1003-1011 1015
1979 NOV 13.0	0 0 0 0 0-1803-1707-1669-1652-1646-1645-1648-1654-1663-1673-1684-1693-1699-1702-1701-1696
JD 2444180.5	0 0 0 0 0 -13 -72 -159 -263 -376 -490 -599 -698 -785 -856 -912 -953 -982-1000-1010-1014
1979 NOV 3.0	0 0 0 0-9999-1677-1639-1623-1617-1614-1614-1617-1621-1626-1633-1640-1647-1652-1655-1655-1652
JD 2444170.5	0 0 0 1 -0 -31 -98 -187 -288 -396 -504 -608 -703 -785 -854 -909 -950 -979 -998-1009-1014
1979 OCT 24.0	0 0 0-9999-1655-1616-1602-1597-1595-1594-1595-1596-1598-1601-1605-1609-1613-1617-1619-1620-1619
JD 2444160.5	0 0 2 0 -8 -53 -125 -214 -313 -417 -520 -618 -708 -787 -853 -906 -947 -977 -997-1008-1014
1979 OCT 14.0	0 0-9999-9999-1598-1585-1582 1583 1583 1583 1583 1583-1582-1583-1584-1587-1589-1591-1593-1593-1593
JD 2444150.5	0 4 2 0 -23 -77 -153 -241 -338 -438 -536 -630 -715 -791 -854 -906 -946 -975 -995-1008-1014
1979 OCT 4.0	0-9999-9999-1582-1571 1572 1574 1576 1577 1577 1576 1574 1573 1572 1571-1571-1571-1572-1573-1573-1573
JD 2444140.5	6 4 1 -5 -42 -103 -180 -268 -363 -459 -553 -643 -724 -796 -856 -906 -945 -974 -994-1007-1014
1979 SEP 24.0	-9999-9999-9999-1558 1561 1566 1570 1573 1574 1573 1572 1569 1566 1564 1562 1560 1560 1559-1558-1558-1558
JD 2444130.5	6 2 0 -18 -64 -129 -208 -296 -388 -480 -571 -656 -733 -802 -860 -908 -945 -974 -994-1007-1013
1979 SEP 14.0	-9999-9999 1547 1552 1559 1566 1571 1574 1574 1573 1570 1566 1562 1559 1555 1552 1551 1549 1549 1548 1548
JD 2444120.5	5 1 -4 -35 -88 -157 -236 -323 -413 -502 -589 -670 -744 -809 -864 -910 -946 -974 -994-1006-1013
1979 SEP 4.0	-9999-3694 1542 1552 1562 1570 1575 1577 1576 1574 1570 1566 1561 1556 1551 1547 1544 1542 1541 1540 1540
JD 2444110.5	3 0 -15 -56 -114 -185 -265 -350 -438 -524 -607 -685 -755 -817 -870 -913 -948 -975 -994-1006-1013
1979 AUG 25.0	-3569 1531 1545 1558 1569 1576 1580 1581 1580 1577 1572 1566 1560 1554 1549 1544 1541 1538 1536 1536 1535
JD 2444100.5	1 -4 -32 -79 -141 -214 -294 -378 -463 -546 -626 -700 -767 -826 -876 -917 -951 -976 -995-1007-1014
1979 AUG 15.0	-2225 1538 1554 1567 1577 1584 1587 1587 1584 1580 1574 1568 1561 1555 1548 1543 1539 1535 1533 1532 1531
JD 2444090.5	0 -15 -52 -105 -170 -244 -323 -406 -488 -569 -645 -716 -779 -835 -883 -922 -954 -978 -996-1008-1014
1979 AUG 5.0	1529 1549 1565 1578 1587 1592 1594 1593 1589 1584 1578 1570 1563 1556 1549 1543 1538 1534 1531 1530 1530
JD 2444080.5	-4 -30 -74 -132 -199 -274 -353 -434 -514 -591 -664 -732 -792 -845 -890 -927 -958 -981 -998-1008-1014
1979 JUL 26.0	1543 1562 1578 1590 1597 1601 1601 1599 1595 1589 1581 1573 1565 1558 1550 1544 1538 1534 1531 1530 1530
	(FLT T)(120)(130)(140)(150)(160)(170)(180)(190)(200)(210)(220)(230)(240)(250)(260)(270)(280)(290)(300)(310)(320)

JD2444200.5	JD2444240.5	JD2444280.5	JD2444320.5	JD2444360.5
1979 NOV 23.0	1980 JAN 2.0	1980 FEB 11.0	1980 MAR 22.0	1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E10

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
JD 2444200.5	0	0	0	0	0	0	35	40	45	51	57	63	69	76	82	90	97	105	113	121	130
1979 NOV 23.0	0	0	0	0	0	0	45	52	60	67	75	82	90	98	106	115	123	132	141	150	159
JD 2444190.5	0	0	0	0	0	35	40	45	51	56	62	68	74	81	88	95	102	110	118	126	135
1979 NOV 13.0	0	0	0	0	0	45	52	60	67	74	82	89	97	105	113	122	130	139	148	157	166
JD 2444180.5	0	0	0	0	9999	40	45	50	55	61	67	73	79	86	92	100	107	115	123	131	140
1979 NOV 3.0	0	0	0	0	156	52	59	67	74	81	89	96	104	112	120	129	137	146	155	164	173
JD 2444170.5	0	0	0	8546	40	45	50	55	60	66	71	77	84	90	97	105	112	120	128	136	145
1979 OCT 24.0	0	0	0	156	53	59	66	73	81	88	95	103	111	119	127	136	144	153	162	171	180
JD 2444160.5	0	0	5343	9999	45	50	55	60	65	70	76	82	89	95	102	109	117	125	133	141	150
1979 OCT 14.0	0	0	156	171	60	66	73	80	87	95	102	110	118	126	134	143	151	160	169	178	187
JD 2444150.5	0	3854	6483	45	50	55	59	64	70	75	81	87	93	100	107	114	122	130	138	146	154
1979 OCT 4.0	0	156	171	60	66	73	80	87	94	102	109	117	125	133	141	150	158	167	176	185	194
JD 2444140.5	2998	4170	9999	50	54	59	64	69	74	80	86	92	98	105	112	119	127	134	143	151	159
1979 SEP 24.0	156	171	184	66	73	80	87	94	101	108	116	124	132	140	148	157	165	174	183	192	201
JD 2444130.5	3058	5158	50	55	59	63	68	73	79	84	90	96	103	110	117	124	132	139	147	156	164
1979 SEP 14.0	170	184	67	73	80	86	93	100	108	115	123	130	138	147	155	164	172	181	190	199	208
JD 2444120.5	3384	8678	55	59	63	68	73	78	83	89	95	101	107	114	121	129	136	144	152	160	169
1979 SEP 4.0	184	196	73	80	86	93	100	107	114	122	129	137	145	153	162	170	179	188	197	206	215
JD 2444110.5	4294	55	59	63	67	72	77	82	88	93	99	106	112	119	126	134	141	149	157	165	174
1979 AUG 25.0	196	74	80	86	93	100	106	114	121	128	136	144	152	160	169	177	186	195	204	213	222
JD 2444100.5	7721	59	63	67	72	76	81	86	92	98	104	110	117	124	131	138	146	154	162	170	179
1979 AUG 15.0	208	80	86	93	99	106	113	120	127	135	143	151	159	167	176	184	193	202	211	220	229
JD 2444090.5	59	63	67	71	76	80	85	91	96	102	108	115	122	129	136	143	151	159	167	175	184
1979 AUG 5.0	80	86	93	99	106	112	119	127	134	142	149	157	166	174	183	191	200	209	218	227	236
JD 2444080.5	63	67	71	75	80	85	90	95	101	107	113	119	126	133	141	148	156	164	172	180	189
1979 JUL 26.0	86	93	99	105	112	119	126	133	141	148	156	164	172	181	189	198	207	216	225	234	243

(FLT T)	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M15 E10

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
JD 2444200.5 1979 NOV 23.0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1428	1335	1268	1224	1198	1187	1187
JD 2444190.5 1979 NOV 13.0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1421	1331	1266	1222	1195	1182	1182
JD 2444180.5 1979 NOV 3.0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1414	1327	1264	1220	1193	1180	1180
JD 2444170.5 1979 OCT 24.0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1515	1408	1324	1263	1219	1192	1179	1182
JD 2444160.5 1979 OCT 14.0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1504	1402	1321	1261	1219	1191	1179	1188
JD 2444150.5 1979 OCT 4.0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1493	1395	1318	1260	1218	1191	1181	1207
JD 2444140.5 1979 SEP 24.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1482	1388	1314	1258	1217	1191	1185	1281
JD 2444130.5 1979 SEP 14.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1470	1380	1309	1255	1216	1192	1197	1524
JD 2444120.5 1979 SEP 4.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1457	1372	1304	1252	1214	1193	1249	1297
JD 2444110.5 1979 AUG 25.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1444	1363	1298	1248	1212	1198	1524	1173
JD 2444100.5 1979 AUG 15.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1430	1353	1291	1243	1209	1223	1199	1157
JD 2444090.5 1979 AUG 5.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1505	1416	1343	1284	1238	1207	1524	1164	1153
JD 2444080.5 1979 JUL 26.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1485	1401	1332	1276	1232	1205	1176	1159	1152

(FLT T)	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320

JD2444200.5 1979 NOV 23.0	JD2444240.5 1980 JAN 2.0	JD2444280.5 1980 FEB 11.0	JD2444320.5 1980 MAR 22.0	JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E10

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
JD 2444200.5	0	0	0	0	0	0	2369	1777	1315	944	640	392	190	29	0	0	0	0	0	0	0
1979 NOV 23.0	0	0	0	0	0	0	1990	1493	1145	900	732	622	554	514	492	481	474	469	462	455	445
JD 2444190.5	0	0	0	0	0	2693	2068	1579	1182	854	580	353	166	15	0	0	0	0	0	0	0
1979 NOV 13.0	0	0	0	0	0	2228	1679	1284	996	788	642	544	482	446	427	417	413	409	405	400	395
JD 2444180.5	0	0	0	0	5462	2356	1843	1424	1074	779	529	319	145	3	0	0	0	0	0	0	0
1979 NOV 3.0	0	0	0	0	5923	1893	1457	1131	886	705	574	485	427	393	375	366	362	360	357	355	352
JD 2444170.5	0	0	0	5407	2638	2103	1665	1297	984	715	485	289	126	0	0	0	0	0	0	0	0
1979 OCT 24.0	0	0	0	5893	2127	1655	1296	1019	806	644	525	441	386	352	334	324	320	319	317	316	318
JD 2444160.5	0	0	5353	4471	2357	1903	1520	1191	906	658	444	262	108	0	0	0	0	0	0	0	0
1979 OCT 14.0	0	0	5866	4794	1868	1480	1176	936	746	599	489	410	356	322	302	292	288	286	285	285	293
JD 2444150.5	0	5300	4404	2603	2135	1739	1397	1098	836	607	407	235	90	0	0	0	0	0	0	0	0
1979 OCT 4.0	0	5841	4760	2090	1678	1351	1087	874	703	568	465	388	335	301	279	268	262	259	258	260	283
JD 2444140.5	5249	4340	3772	2359	1953	1600	1290	1016	773	559	372	210	72	0	0	0	0	0	0	0	0
1979 SEP 24.0	5820	4730	3966	1884	1536	1253	1020	828	672	547	449	375	322	286	264	250	243	239	238	243	329
JD 2444130.5	4278	3692	2573	2159	1798	1479	1195	941	714	514	338	185	55	0	0	0	0	0	0	0	1078
1979 SEP 14.0	4705	3927	2093	1729	1429	1179	970	795	650	533	439	367	315	278	254	238	229	224	223	237	1404
JD 2444120.5	3614	3272	2356	1989	1663	1371	1108	871	659	470	304	160	37	0	0	0	0	0	0	0	0
1979 SEP 4.0	3893	3352	1924	1610	1346	1122	932	770	635	524	435	365	312	275	249	232	221	215	214	271	405
JD 2444110.5	3173	2543	2172	1841	1543	1273	1028	806	606	429	272	135	18	0	0	0	0	0	0	2165	0
1979 AUG 25.0	3303	2120	1794	1518	1281	1078	903	752	626	520	434	366	313	275	248	229	217	209	210	2262	247
JD 2444100.5	2914	2346	2011	1709	1433	1182	952	744	556	388	240	111	0	0	0	0	0	0	0	0	0
1979 AUG 15.0	2901	1978	1692	1445	1230	1043	880	740	620	519	436	369	318	279	250	230	216	207	229	275	217
JD 2444090.5	2510	2173	1868	1589	1332	1096	881	684	507	349	208	86	0	0	0	0	0	0	126	0	0
1979 AUG 5.0	2160	1866	1610	1386	1189	1015	863	730	616	520	440	375	324	285	255	234	219	208	755	218	208
JD 2444080.5	2327	2020	1738	1478	1237	1015	812	626	459	309	176	61	0	0	0	0	0	0	0	0	0
1979 JUL 26.0	2038	1775	1543	1338	1155	992	849	724	615	523	446	383	332	293	263	241	225	213	221	210	207

(FLT T)	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320

JD2444200.5 1979 NOV 23.0 JD2444240.5 1980 JAN 2.0 JD2444280.5 1980 FEB 11.0 JD2444320.5 1980 MAR 22.0 JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M15 E10

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
JD 2444200.5	0	0	0	0	0	0	4358	3270	2460	1844	1373	1014	744	543	492	481	474	469	462	455	445
1979 NOV 23.0	0	0	0	0	0	0	74	175	276	376	477	577	676	775	874	971	1069	1165	1262	1358	1453
JD 2444190.5	0	0	0	0	0	4921	3747	2863	2178	1642	1222	897	648	461	427	417	413	409	405	400	395
1979 NOV 13.0	0	0	0	0	0	23	119	221	322	423	523	623	723	821	920	1018	1115	1212	1308	1404	1499
JD 2444180.5	0	0	0	0	9999	4250	3300	2555	1960	1484	1104	804	572	396	375	366	362	360	357	355	352
1979 NOV 3.0	0	0	0	0	3558	65	166	267	368	469	570	670	769	868	967	1064	1162	1258	1355	1451	1546
JD 2444170.5	0	0	0	9999	4765	3758	2961	2316	1789	1359	1009	730	512	352	334	324	320	319	317	316	318
1979 OCT 24.0	0	0	0	3506	17	112	213	314	416	517	617	717	817	916	1014	1112	1209	1306	1402	1498	1593
JD 2444160.5	0	0	9999	9265	4225	3383	2696	2126	1652	1258	933	671	464	322	302	292	288	286	285	285	293
1979 OCT 14.0	0	0	3452	3553	58	159	261	362	464	565	665	765	865	963	1062	1160	1257	1354	1450	1546	1641
JD 2444150.5	0	9999	9164	4693	3813	3090	2484	1972	1539	1175	871	624	425	301	279	268	262	259	258	260	283
1979 OCT 4.0	0	3400	3501	13	106	208	309	411	512	613	714	814	913	1012	1111	1208	1306	1402	1499	1595	1690
JD 2444140.5	9999	9070	7738	4243	3489	2853	2310	1844	1445	1105	820	585	394	286	264	250	243	239	238	243	329
1979 SEP 24.0	3348	3449	3550	54	155	257	359	460	562	663	763	863	963	1062	1160	1258	1355	1452	1548	1644	1739
JD 2444130.5	8983	7619	4666	3888	3227	2658	2164	1736	1365	1046	777	552	370	278	254	238	229	224	223	237	2482
1979 SEP 14.0	3398	3499	10	104	205	307	409	511	612	713	813	913	1013	1112	1210	1308	1405	1502	1598	1694	1786
JD 2444120.5	7507	6624	4280	3599	3009	2493	2040	1642	1294	994	739	525	349	275	249	232	221	215	214	271	405
1979 SEP 4.0	3449	3550	53	154	256	358	460	562	663	764	864	964	1064	1163	1261	1359	1456	1553	1649	1745	1842
JD 2444110.5	6477	4663	3966	3359	2824	2351	1930	1558	1232	948	706	501	332	275	248	229	217	209	210	4427	247
1979 AUG 25.0	3501	7	105	206	308	410	512	613	715	816	916	1016	1116	1215	1313	1411	1508	1605	1701	1793	1893
JD 2444100.5	5815	4323	3703	3154	2663	2225	1832	1484	1175	907	675	480	318	279	250	230	216	207	229	275	217
1979 AUG 15.0	3554	56	157	259	361	463	565	666	768	869	969	1069	1169	1268	1366	1464	1561	1658	1754	1851	1946
JD 2444090.5	4670	4039	3478	2975	2521	2111	1743	1414	1123	868	648	461	324	285	255	234	219	208	882	218	208
1979 AUG 5.0	9	109	211	313	414	516	618	720	821	922	1023	1123	1222	1321	1420	1517	1615	1712	1809	1904	2000
JD 2444080.5	4365	3795	3282	2815	2392	2008	1661	1350	1074	832	622	443	332	293	263	241	225	213	221	210	207
1979 JUL 26.0	63	164	265	367	469	571	673	775	876	977	1077	1177	1277	1376	1474	1572	1669	1766	1863	1959	2054

(FLT T)	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

M15
E11

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444340.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671746	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.601	DEGREES
MEAN ANOM. AT EPOCH	=	96.768	DEGREES
DATE OF NODAL PASSAGE	=	2444505.377	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444340.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338723	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.405	DEGREES
ARG. OF PERIHELION	=	286.291	DEGREES
MEAN ANOM. AT EPOCH	=	204.079	DEGREES
DATE OF NODAL PASSAGE	=	2444072.521	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.062	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E11

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2444200.5	143	154	184	323	489	230	218	227	241	259	278	301	327	358	394	440	498	574	677	818	1013
1979 NOV 23.0	207	203	204	261	371	195	168	152	140	129	120	115	116	124	143	172	214	272	350	456	600
JD 2444190.5	138	153	205	874	260	203	206	218	235	254	276	301	329	363	404	455	521	609	728	894	1118
1979 NOV 13.0	186	184	197	613	220	168	151	138	127	119	113	111	117	130	154	189	237	303	393	517	681
JD 2444180.5	136	158	280	469	199	187	197	212	231	252	275	302	333	371	417	474	550	651	791	985	1238
1979 NOV 3.0	167	170	223	360	174	149	136	126	117	111	108	111	120	139	168	208	264	340	444	587	773
JD 2444170.5	138	178	776	228	173	176	190	207	228	250	276	305	339	381	432	497	584	702	866	1092	1369
1979 OCT 24.0	151	164	545	197	148	133	123	115	109	105	106	113	127	150	184	231	295	383	505	671	874
JD 2444160.5	144	244	413	169	159	169	185	204	226	250	278	310	347	393	451	526	626	764	958	1216	0
1979 OCT 14.0	139	188	323	152	131	120	113	107	103	103	107	118	137	165	204	258	332	435	578	768	0
JD 2444150.5	160	737	192	146	150	164	182	202	225	252	281	316	358	409	474	560	677	841	1068	1354	1483
1979 OCT 4.0	134	519	170	129	117	110	104	101	100	103	111	126	149	182	228	290	376	498	665	877	990
JD 2444140.5	216	324	142	135	144	160	180	202	226	254	287	325	371	428	502	602	740	935	1198	1499	1454
1979 SEP 24.0	156	262	131	114	106	102	98	97	99	105	117	136	164	202	255	328	430	574	769	993	978
JD 2444130.5	790	156	124	128	141	159	179	202	229	259	294	336	387	452	537	654	818	1050	1345	1484	1424
1979 SEP 14.0	559	141	112	103	99	96	95	96	101	110	126	149	182	226	287	373	495	666	886	1010	966
JD 2444120.5	226	122	116	125	139	158	180	204	233	265	303	349	407	481	580	718	916	1187	1501	1454	1394
1979 SEP 4.0	190	111	100	96	93	93	94	98	106	118	138	165	203	254	326	428	575	777	1013	998	954
JD 2444110.5	129	111	113	123	139	159	182	208	238	273	315	366	431	516	633	800	1038	1346	1483	1424	1363
1979 AUG 25.0	115	98	93	91	91	92	95	102	113	129	152	184	227	288	373	497	674	905	1031	986	942
JD 2444100.5	112	106	111	123	140	161	185	213	245	283	329	387	461	561	701	904	1186	0	1452	1392	1332
1979 AUG 15.0	97	91	90	89	91	94	99	108	122	142	169	206	257	329	432	583	795	0	1019	974	930
JD 2444090.5	107	105	111	124	142	164	189	219	254	296	347	412	498	617	788	1035	1358	1478	1420	1361	1300
1979 AUG 5.0	91	89	89	90	93	98	106	117	134	157	188	232	292	379	505	691	936	1052	1007	962	917
JD 2444080.5	105	104	112	126	145	168	196	228	266	312	370	444	546	690	900	1197	0	1446	1388	1329	1268
1979 JUL 26.0	90	90	91	93	98	104	114	128	148	175	212	263	336	441	599	825	0	1040	995	950	905

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD 2444400.5																					
1980 JUN 10.0																					
JD 2444440.5																					
1980 JUL 20.0																					
JD 2444480.5																					
1980 AUG 29.0																					
JD 2444520.5																					
1980 OCT 8.0																					
JD 2444560.5																					
1980 NOV 17.0																					

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E08

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD 2444200.5	886	787	687	586	485	384	282	181	80	3571	3473	3372	3271	3171	3071	2971	2872	2773	2675	2577	2480
1979 NOV 23.0	1226	1292	1357	1423	1488	1553	1618	1683	1748	-1744	-1578	-1445	-1351	-1282	-1229	-1184	-1145	-1109	-1074	-1040	-1006
JD 2444190.5	840	741	641	540	439	338	236	135	0	3528	3427	3326	3225	3125	3024	2925	2825	2727	2629	2531	2434
1979 NOV 13.0	1258	1323	1388	1453	1518	1583	1648	1713	0	-1668	-1514	-1402	-1323	-1263	-1216	-1175	-1138	-1103	-1069	-1035	-1000
JD 2444180.5	793	694	594	493	392	291	189	88	3579	3482	3381	3280	3179	3078	2978	2878	2779	2680	2582	2485	2388
1979 NOV 3.0	1289	1354	1419	1483	1548	1613	1678	1743	-1759	-1594	-1461	-1367	-1300	-1248	-1205	-1167	-1132	-1097	-1063	-1029	-994
JD 2444170.5	746	646	546	446	345	244	142	42	3536	3435	3334	3232	3131	3031	2930	2831	2731	2633	2535	2437	2340
1979 OCT 24.0	1321	1386	1450	1514	1579	1643	1708	1773	-1682	-1528	-1417	-1339	-1282	-1236	-1196	-1160	-1125	-1091	-1057	-1022	-987
JD 2444160.5	698	598	498	398	297	196	94	3584	3489	3387	3286	3184	3083	2983	2882	2783	2683	2585	2487	2389	2292
1979 OCT 14.0	1353	1417	1481	1545	1610	1674	1739	-1770	-1606	-1473	-1382	-1317	-1267	-1225	-1188	-1153	-1118	-1084	-1050	-1015	-979
JD 2444150.5	649	550	450	349	248	147	46	3542	3441	3339	3237	3136	3035	2934	2834	2734	2635	2536	2438	2340	2243
1979 OCT 4.0	1386	1449	1513	1577	1641	1706	1770	-1693	-1538	-1429	-1354	-1299	-1255	-1216	-1180	-1146	-1111	-1077	-1042	-1007	-970
JD 2444140.5	600	500	400	300	199	98	3588	3493	3391	3290	3188	3086	2985	2884	2784	2684	2585	2487	2389	2291	2194
1979 SEP 24.0	1418	1482	1545	1609	1673	1737	-1777	-1613	-1483	-1394	-1332	-1284	-1244	-1207	-1173	-1138	-1104	-1069	-1033	-997	-960
JD 2444130.5	550	450	350	249	149	48	3544	3443	3341	3239	3138	3036	2935	2834	2734	2634	2535	2436	2338	2241	2144
1979 SEP 14.0	1451	1514	1577	1641	1705	1769	-1697	-1544	-1439	-1367	-1315	-1272	-1235	-1199	-1165	-1130	-1095	-1060	-1024	-987	-949
JD 2444120.5	499	399	299	198	98	3591	3494	3392	3290	3188	3087	2985	2884	2783	2683	2583	2484	2385	2287	2190	2093
1979 SEP 4.0	1485	1547	1610	1674	1738	-1782	-1615	-1489	-1405	-1346	-1301	-1262	-1226	-1191	-1156	-1121	-1086	-1050	-1013	-975	-937
JD 2444110.5	447	347	247	147	46	3544	3442	3340	3238	3137	3035	2933	2832	2731	2631	2531	2432	2333	2235	2138	2041
1979 AUG 25.0	1518	1581	1643	1707	1771	-1696	-1546	-1445	-1379	-1329	-1289	-1252	-1217	-1182	-1147	-1111	-1075	-1038	-1001	-962	-923
JD 2444100.5	394	294	194	94	3591	3491	3389	3288	3186	3084	2982	2881	2779	2679	2578	2479	2379	2281	2183	2085	1988
1979 AUG 15.0	1552	1614	1677	1740	-1782	-1612	-1491	-1413	-1359	-1316	-1278	-1243	-1207	-1172	-1137	-1100	-1063	-1026	-987	-948	-908
JD 2444090.5	340	241	141	40	3539	3437	3336	3234	3132	3030	2928	2827	2726	2625	2525	2425	2326	2227	2129	2031	1934
1979 AUG 5.0	1586	1649	1711	1775	-1688	-1543	-1450	-1389	-1343	-1304	-1268	-1233	-1197	-1162	-1125	-1088	-1050	-1012	-972	-932	-891
JD 2444080.5	286	186	86	3585	3484	3383	3281	3179	3077	2975	2874	2772	2671	2570	2470	2370	2271	2172	2074	1977	1880
1979 JUL 26.0	1621	1683	1746	-1771	-1603	-1491	-1420	-1371	-1330	-1293	-1258	-1222	-1186	-1150	-1113	-1074	-1036	-996	-956	-915	-874

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)

JD2443800.5	JD2443840.5	JD2443880.5	JD2443920.5	JD2443960.5
1978 OCT 19.0	1978 NOV 28.0	1979 JAN 7.0	1979 FEB 16.0	1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E08

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD 2444200.5	167	170	179	196	223	269	353	539	1211	3506	764	432	308	245	209	188	175	168	167	171	180
1979 NOV 23.0	738	781	823	864	902	935	963	984	997	996	927	817	716	639	585	547	524	511	507	510	521
JD 2444190.5	161	166	178	198	231	288	400	689	0	1290	540	348	263	217	190	173	164	160	161	167	179
1979 NOV 13.0	755	798	840	880	916	948	973	991	0	974	877	768	679	614	569	540	523	516	517	526	542
JD 2444180.5	155	162	177	200	240	313	468	994	4553	746	408	286	226	192	172	160	153	152	155	163	178
1979 NOV 3.0	773	816	857	896	931	960	982	996	998	934	824	723	647	593	558	537	526	525	531	546	568
JD 2444170.5	148	158	175	203	252	346	582	1981	1293	504	319	238	196	170	155	146	143	144	149	159	176
1979 OCT 24.0	791	834	874	912	944	971	990	999	978	883	774	685	621	578	551	537	533	537	550	570	600
JD 2444160.5	141	153	173	207	267	396	809	5772	689	365	254	200	169	150	139	134	132	135	142	155	175
1979 OCT 14.0	810	852	891	927	957	981	995	999	939	829	727	652	601	568	549	541	543	553	572	600	637
JD 2444150.5	133	148	171	211	288	477	1512	1198	441	275	204	167	145	132	124	121	122	126	135	149	173
1979 OCT 4.0	829	870	908	942	969	989	999	981	886	776	688	626	586	562	550	549	557	574	600	635	682
JD 2444140.5	125	141	169	217	319	640	6685	585	304	210	164	139	123	114	110	108	111	116	127	143	171
1979 SEP 24.0	848	888	924	955	979	995	999	940	829	729	655	607	576	561	556	562	576	600	633	678	736
JD 2444130.5	116	134	165	225	370	1146	983	351	217	161	131	114	103	98	95	95	99	106	117	136	168
1979 SEP 14.0	867	906	940	968	988	999	982	885	775	689	630	593	572	564	567	579	600	631	674	730	802
JD 2444120.5	105	125	161	237	475	6236	436	226	156	122	103	91	85	81	80	82	86	94	107	128	164
1979 SEP 4.0	886	923	954	979	995	999	938	826	727	657	611	585	573	572	582	601	630	670	723	793	883
JD 2444110.5	92	114	155	257	816	661	239	148	110	90	78	71	67	65	65	68	73	81	94	117	159
1979 AUG 25.0	905	939	968	988	999	980	880	770	687	632	599	583	578	585	602	629	666	717	784	870	984
JD 2444100.5	77	99	146	299	3305	258	136	94	74	62	55	51	49	49	50	53	57	65	79	102	151
1979 AUG 15.0	923	954	979	995	999	932	818	722	656	616	594	586	589	603	628	663	711	775	858	967	1112
JD 2444090.5	57	78	131	456	298	113	71	53	44	38	34	33	32	32	33	36	40	47	59	81	137
1979 AUG 5.0	940	968	989	999	975	869	761	683	634	606	594	594	606	628	660	706	766	845	950	1089	1279
JD 2444080.5	30	45	96	551	71	39	27	21	18	16	15	14	14	15	15	17	19	24	31	47	103
1979 JUL 26.0	956	980	996	998	921	805	714	655	621	604	600	609	628	658	701	758	834	933	1066	1247	1502
(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)

JD2443800.5	JD2443840.5	JD2443880.5	JD2443920.5	JD2443960.5
1978 OCT 19.0	1978 NOV 28.0	1979 JAN 7.0	1979 FEB 16.0	1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E08

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD 2444200.5	-344	-281	-222	-167	-118	-76	-42	-17	-3	4	72	181	283	365	427	475	512	541	564	583	599
1979 NOV 23.0	2289	2296	2299	2300	2295	2287	2273	2254	2229	1988	1904	1798	1712	1657	1629	1623	1638	1671	1723	1798	1901
JD 2444190.5	-316	-255	-197	-144	-98	-59	-29	-9	0	26	120	228	319	390	443	484	516	541	562	578	592
1979 NOV 13.0	2273	2279	2280	2279	2272	2261	2245	2223	0	1935	1834	1737	1668	1628	1615	1621	1648	1695	1764	1861	1993
JD 2444180.5	-288	-228	-173	-123	-80	-45	-19	-3	2	64	170	270	350	410	456	491	518	540	557	571	583
1979 NOV 3.0	2257	2260	2260	2256	2248	2234	2215	2191	1949	1870	1767	1683	1631	1607	1606	1627	1667	1730	1820	1944	2116
JD 2444170.5	-260	-202	-149	-102	-62	-32	-10	-0	21	112	218	307	375	426	465	495	518	536	551	563	573
1979 OCT 24.0	2239	2241	2239	2233	2222	2206	2184	2157	1898	1800	1705	1639	1603	1593	1606	1641	1697	1779	1894	2056	2287
JD 2444160.5	-232	-177	-126	-83	-47	-20	-4	1	58	162	260	337	395	438	471	496	516	531	543	553	561
1979 OCT 14.0	2221	2221	2217	2208	2195	2176	2151	1908	1833	1731	1651	1603	1584	1588	1615	1665	1739	1846	1995	2210	2531
JD 2444150.5	-205	-152	-105	-65	-33	-11	-0	18	106	211	297	362	411	447	474	495	512	524	534	542	549
1979 OCT 4.0	2202	2200	2193	2182	2166	2144	2117	1858	1762	1669	1607	1576	1572	1591	1634	1701	1798	1936	2135	2431	2903
JD 2444140.5	-179	-128	-84	-48	-21	-5	1	55	158	254	327	382	422	452	475	492	506	516	524	530	535
1979 SEP 24.0	2182	2177	2168	2155	2135	2111	1865	1792	1692	1616	1573	1559	1570	1605	1664	1752	1879	2062	2333	2763	3525
JD 2444130.5	-153	-106	-66	-34	-12	-0	17	105	207	290	352	397	430	454	473	487	498	506	512	517	521
1979 SEP 14.0	2161	2154	2142	2126	2104	2076	1815	1720	1630	1573	1549	1550	1577	1629	1709	1824	1992	2240	2630	3310	4746
JD 2444120.5	-128	-85	-48	-21	-5	0	56	158	250	320	370	407	434	454	469	481	489	495	499	502	505
1979 SEP 4.0	2138	2129	2114	2095	2070	1821	1747	1650	1578	1542	1534	1553	1596	1667	1772	1925	2151	2505	3110	4349	8154
JD 2444110.5	-105	-65	-33	-11	-0	18	107	207	286	343	384	413	435	451	463	472	478	482	485	487	488
1979 AUG 25.0	2115	2102	2085	2063	2035	1769	1674	1589	1539	1521	1530	1566	1629	1723	1862	2068	2387	2927	3997	7021	9999
JD 2444100.5	-83	-47	-21	-4	0	60	161	249	314	360	392	416	434	446	455	462	466	468	469	470	470
1979 AUG 15.0	2089	2075	2054	2029	1776	1699	1605	1540	1511	1511	1538	1593	1678	1804	1991	2279	2760	3687	6124	9999	9999
JD 2444090.5	-63	-32	-11	-0	22	114	210	283	335	371	397	416	430	439	446	450	452	453	452	452	450
1979 AUG 5.0	2063	2045	2022	1993	1720	1625	1546	1504	1494	1514	1559	1635	1749	1919	2179	2608	3414	5404	9999	9999	9999
JD 2444080.5	-45	-19	-3	1	68	168	250	309	350	378	399	413	424	430	435	437	437	436	434	432	430
1979 JUL 26.0	2035	2014	1988	1729	1648	1558	1502	1482	1492	1529	1596	1699	1853	2088	2471	3174	4821	9999	9999	9999	9999

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)

JD2443800.5	JD2443840.5	JD2443880.5	JD2443920.5	JD2443960.5
1978 OCT 19.0	1978 NOV 28.0	1979 JAN 7.0	1979 FEB 16.0	1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E08

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD 2444200.5	116	113	109	106	104	101	99	97	96	3852	944	596	476	416	379	352	330	311	294	279	264
1979 NOV 23.0	211	205	199	194	189	184	179	175	171	324	319	311	302	293	282	272	262	251	241	230	219
JD 2444190.5	114	111	108	105	102	100	98	96	0	1587	732	531	447	400	368	344	323	305	289	273	259
1979 NOV 13.0	206	201	195	190	185	180	176	172	0	320	313	305	296	286	276	265	255	244	233	222	212
JD 2444180.5	112	109	106	103	101	99	97	95	5230	1006	616	498	425	386	358	336	317	300	284	268	253
1979 NOV 3.0	202	196	191	186	181	177	172	168	321	315	308	299	289	279	269	258	247	237	226	215	204
JD 2444170.5	111	107	105	102	100	98	96	94	1768	761	544	456	407	375	350	329	311	294	278	263	248
1979 OCT 24.0	198	192	187	182	177	173	169	165	317	310	302	292	282	272	262	251	240	229	218	207	196
JD 2444160.5	109	106	103	101	98	96	95	7045	1056	631	497	433	393	365	342	323	305	289	273	258	243
1979 OCT 14.0	194	188	183	178	174	169	165	318	312	305	296	286	275	265	254	243	232	221	210	199	188
JD 2444150.5	107	104	102	99	97	95	94	1913	779	554	464	414	382	356	335	317	300	283	268	252	237
1979 OCT 4.0	190	184	179	175	170	166	162	314	307	298	289	279	268	258	247	236	225	214	202	191	180
JD 2444140.5	106	103	100	98	96	94	9228	1083	640	504	439	400	371	348	329	311	294	278	262	246	231
1979 SEP 24.0	186	180	176	171	166	162	315	309	301	292	282	272	261	250	239	228	217	206	194	183	171
JD 2444130.5	104	101	99	97	95	93	1976	786	559	470	421	388	362	341	322	305	288	272	256	240	225
1979 SEP 14.0	182	177	172	167	163	159	310	304	295	285	275	264	253	242	231	220	209	197	186	174	163
JD 2444120.5	102	100	98	96	94	9999	1080	642	508	445	406	377	354	334	316	299	282	266	250	234	218
1979 SEP 4.0	178	173	168	163	159	311	306	298	288	278	267	257	246	235	223	212	201	189	177	166	154
JD 2444110.5	101	98	96	94	93	1917	778	560	473	426	393	368	347	328	310	293	276	260	244	227	211
1979 AUG 25.0	174	169	164	160	156	307	300	291	281	271	260	249	238	226	215	204	192	180	169	157	144
JD 2444100.5	99	97	95	93	9999	1043	635	509	449	411	383	360	340	321	304	287	270	254	237	220	203
1979 AUG 15.0	170	165	160	156	308	302	294	284	274	263	252	241	230	218	207	195	183	171	159	147	135
JD 2444090.5	98	96	94	92	1742	756	557	475	430	398	373	352	333	315	298	281	264	247	230	212	194
1979 AUG 5.0	166	161	157	153	304	296	287	277	266	255	244	233	221	210	198	186	174	162	150	137	125
JD 2444080.5	97	95	93	6901	979	623	508	451	415	388	365	345	326	309	291	274	257	240	222	204	184
1979 JUL 26.0	162	157	153	305	298	290	280	269	258	247	236	224	213	201	189	177	165	153	140	127	114

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(.90)	(80)
JD2443800.5 1978 OCT 19.0				JD2443840.5 1978 NOV 28.0				JD2443880.5 1979 JAN 7.0				JD2443920.5 1979 FEB 16.0				JD2443960.5 1979 MAR 28.0			

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M15 E08

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD 2444200.5 1979 NOV 23.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444190.5 1979 NOV 13.0	772	772	772	772	772	772	772	772	0	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444180.5 1979 NOV 3.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444170.5 1979 OCT 24.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444160.5 1979 OCT 14.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444150.5 1979 OCT 4.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444140.5 1979 SEP 24.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444130.5 1979 SEP 14.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444120.5 1979 SEP 4.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444110.5 1979 AUG 25.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444100.5 1979 AUG 15.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444090.5 1979 AUG 5.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444080.5 1979 JUL 26.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)

JD2443800.5 1978 OCT 19.0	JD2443840.5 1978 NOV 28.0	JD2443880.5 1979 JAN 7.0	JD2443920.5 1979 FEB 16.0	JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

M15
E08

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

	(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD 2444200.5		1985	2169	2360	2557	2758	2962	3168	3374	3579	3488	2795	2235	1844	1587	1419	1311	1243	1205	1188	1188	1204
1979 NOV 23.0		1561	1667	1779	1896	2017	2142	2269	2399	2530	2349	1818	1360	1014	769	605	506	464	469	511	580	672
JD 2444190.5		2057	2244	2438	2637	2840	3046	3254	3460	0	3150	2505	2028	1710	1503	1372	1289	1242	1220	1217	1231	1260
1979 NOV 13.0		1619	1728	1843	1962	2085	2212	2341	2472	0	2112	1599	1191	894	690	560	493	479	508	570	657	765
JD 2444180.5		2131	2321	2518	2719	2925	3132	3341	3548	3523	2820	2250	1857	1601	1439	1339	1280	1250	1244	1256	1285	1329
1979 NOV 3.0		1680	1792	1909	2031	2156	2285	2416	2548	2417	1872	1399	1043	794	628	533	497	510	562	643	748	872
JD 2444170.5		2208	2401	2600	2804	3011	3220	3429	3637	3171	2515	2034	1717	1517	1393	1319	1282	1270	1279	1307	1351	1412
1979 OCT 24.0		1743	1858	1978	2102	2230	2360	2493	2627	2169	1640	1220	917	712	585	524	518	558	631	732	854	997
JD 2444160.5		2287	2483	2684	2890	3099	3309	3519	3538	2825	2247	1855	1606	1453	1362	1313	1295	1301	1327	1371	1432	1513
1979 OCT 14.0		1809	1927	2050	2176	2306	2439	2573	2476	1915	1427	1064	813	651	562	534	558	622	717	837	978	1140
JD 2444150.5		2368	2567	2771	2979	3189	3401	3611	3170	2504	2022	1713	1522	1408	1346	1320	1321	1344	1387	1449	1531	1634
1979 OCT 4.0		1878	1999	2124	2253	2385	2520	2656	2214	1669	1238	933	730	610	559	565	617	704	820	960	1122	1306
JD 2444140.5		2452	2654	2860	3070	3282	3494	3530	2806	2225	1840	1602	1460	1381	1344	1340	1359	1401	1463	1546	1651	1781
1979 SEP 24.0		1950	2073	2201	2333	2467	2604	2522	1943	1443	1076	826	671	592	578	615	694	804	941	1103	1288	1499
JD 2444130.5		2539	2743	2951	3163	3376	3589	3143	2470	1994	1696	1519	1419	1370	1358	1373	1412	1474	1557	1663	1796	1958
1979 SEP 14.0		2024	2151	2281	2415	2552	2690	2243	1680	1244	941	745	636	599	620	687	791	924	1084	1269	1481	1725
JD 2444120.5		2629	2835	3045	3258	3472	3496	2759	2182	1810	1588	1462	1397	1375	1386	1422	1482	1565	1672	1807	1972	2175
1979 SEP 4.0		2101	2230	2364	2501	2639	2552	1951	1441	1075	834	691	628	630	684	780	909	1066	1250	1463	1708	1991
JD 2444110.5		2721	2929	3141	3356	3571	3086	2411	1949	1670	1511	1427	1394	1397	1430	1487	1570	1678	1813	1981	2187	2441
1979 AUG 25.0		2181	2313	2450	2589	2729	2249	1671	1234	939	758	665	646	686	772	895	1049	1232	1444	1690	1975	2307
JD 2444100.5		2816	3026	3240	3456	3430	2683	2119	1769	1568	1460	1413	1409	1436	1491	1572	1680	1817	1986	2195	2452	2769
1979 AUG 15.0		2263	2399	2538	2679	2557	1934	1420	1063	837	713	670	693	768	884	1034	1214	1426	1672	1958	2293	2688
JD 2444090.5		2914	3126	3342	3558	2995	2327	1889	1636	1499	1435	1420	1442	1494	1573	1680	1817	1988	2199	2459	2781	3184
1979 AUG 5.0		2348	2487	2629	2773	2225	1637	1208	931	770	701	706	768	876	1021	1199	1409	1655	1941	2277	2675	3156
JD 2444080.5		3014	3229	3445	3328	2577	2038	1718	1544	1460	1433	1447	1495	1572	1678	1815	1986	2199	2462	2787	3196	3715
1979 JUL 26.0		2436	2578	2722	2531	1887	1378	1040	839	741	724	773	872	1011	1185	1394	1638	1925	2262	2662	3146	3742

	(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)

JD2443800.5 1978 OCT 19.0 | JD2443840.5 1978 NOV 28.0 | JD2443880.5 1979 JAN 7.0 | JD2443920.5 1979 FEB 16.0 | JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E08

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)
JD 2444200.5	3547	3837	4139	4452	4775	5104	5437	5773	6108	5838	4613	3595	2859	2356	2023	1817	1707	1673	1699	1769	1876
1979 NOV 23.0	886	787	687	586	485	384	282	181	80	3571	3473	3372	3271	3171	3071	2971	2872	2773	2675	2577	2480
JD 2444190.5	3676	3973	4280	4599	4925	5258	5595	5933	0	5262	4104	3219	2604	2194	1932	1783	1721	1727	1787	1888	2025
1979 NOV 13.0	840	741	641	540	439	338	236	135	0	3528	3427	3326	3225	3125	3024	2925	2825	2727	2629	2531	2434
JD 2444180.5	3811	4113	4427	4750	5081	5417	5756	6096	5940	4692	3649	2900	2395	2068	1872	1777	1760	1806	1900	2033	2201
1979 NOV 3.0	793	694	594	493	392	291	189	88	3579	3482	3381	3280	3179	3078	2978	2878	2779	2680	2582	2485	2388
JD 2444170.5	3951	4259	4578	4906	5241	5580	5922	6264	5341	4155	3253	2634	2229	1978	1844	1800	1828	1911	2039	2206	2409
1979 OCT 24.0	746	646	546	446	345	244	142	42	3536	3435	3334	3232	3131	3031	2930	2831	2731	2633	2535	2437	2340
JD 2444160.5	4096	4410	4734	5066	5405	5748	6092	6014	4739	3675	2920	2419	2104	1923	1847	1853	1923	2044	2207	2410	2653
1979 OCT 14.0	698	598	498	398	297	196	94	3584	3489	3387	3286	3184	3083	2983	2882	2783	2683	2585	2487	2389	2292
JD 2444150.5	4246	4566	4895	5232	5575	5920	6267	5385	4173	3261	2646	2252	2018	1905	1884	1937	2048	2207	2409	2653	2941
1979 OCT 4.0	649	550	450	349	248	147	46	3542	3441	3339	3237	3136	3035	2934	2834	2734	2635	2536	2438	2340	2243
JD 2444140.5	4402	4727	5061	5402	5749	6097	6053	4749	3668	2915	2428	2131	1973	1922	1955	2053	2205	2404	2648	2939	3280
1979 SEP 24.0	600	500	400	300	199	98	3588	3493	3391	3290	3188	3086	2985	2884	2784	2684	2585	2487	2389	2291	2194
JD 2444130.5	4563	4893	5232	5578	5928	6279	5386	4151	3238	2637	2264	2055	1969	1977	2060	2203	2398	2640	2932	3277	3683
1979 SEP 14.0	550	450	350	249	149	48	3544	3443	3341	3239	3138	3036	2935	2834	2734	2634	2535	2436	2338	2241	2144
JD 2444120.5	4729	5065	5409	5759	6111	6048	4711	3623	2885	2422	2153	2025	2005	2070	2202	2390	2630	2922	3269	3680	4166
1979 SEP 4.0	499	399	299	198	98	3591	3494	3392	3290	3188	3087	2985	2884	2783	2683	2583	2484	2385	2287	2190	2093
JD 2444110.5	4901	5243	5591	5944	6300	5335	4082	3183	2609	2268	2093	2040	2084	2202	2382	2619	2909	3258	3671	4162	4748
1979 AUG 25.0	447	347	247	147	46	3544	3442	3340	3238	3137	3035	2933	2832	2731	2631	2531	2432	2333	2235	2138	2041
JD 2444100.5	5079	5425	5778	6135	5987	4617	3539	2832	2405	2173	2084	2102	2204	2375	2606	2895	3243	3659	4153	4745	5457
1979 AUG 15.0	394	294	194	94	3591	3491	3389	3288	3186	3084	2982	2881	2779	2679	2578	2479	2379	2281	2183	2085	1988
JD 2444090.5	5262	5613	5970	6331	5220	3963	3097	2567	2269	2136	2126	2210	2370	2594	2879	3226	3643	4140	4737	5456	6341
1979 AUG 5.0	340	241	141	40	3539	3437	3336	3234	3132	3030	2928	2827	2726	2625	2525	2425	2326	2227	2129	2031	1934
JD 2444080.5	5450	5806	6168	5860	4463	3415	2759	2383	2201	2157	2220	2366	2582	2863	3208	3624	4124	4724	5449	6341	7457
1979 JUL 26.0	286	186	86	3585	3484	3383	3281	3179	3077	2975	2874	2772	2671	2570	2470	2370	2271	2172	2074	1977	1880

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)

JD2443800.5 1978 OCT 19.0 | JD2443840.5 1978 NOV 28.0 | JD2443880.5 1979 JAN 7.0 | JD2443920.5 1979 FEB 16.0 | JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

M15
E09

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444100.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671773	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.590	DEGREES
MEAN ANOM. AT EPOCH	=	220.224	DEGREES
DATE OF NODAL PASSAGE	=	2444140.130	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444100.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338662	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.400	DEGREES
ARG. OF PERIHELION	=	286.284	DEGREES
MEAN ANOM. AT EPOCH	=	78.314	DEGREES
DATE OF NODAL PASSAGE	=	2444072.529	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.059	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E09

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
JD 2444200.5	553	564	581	603	630	665	716	1265	820	862	933	1020	1126	1259	1432	0	0	0	0	0	0
1979 NOV 23.0	297	337	383	433	488	549	621	982	782	864	969	1091	1237	1413	1633	0	0	0	0	0	0
JD 2444190.5	575	592	615	644	679	724	812	926	896	970	1064	1180	1326	1514	0	0	0	0	0	0	0
1979 NOV 13.0	331	377	427	483	545	615	711	834	875	983	1111	1265	1452	1687	0	0	0	0	0	0	0
JD 2444180.5	603	626	655	692	736	796	1226	933	1003	1104	1229	1386	1590	0	0	0	0	0	0	0	0
1979 NOV 3.0	371	422	478	541	612	694	989	888	994	1128	1289	1486	1734	0	0	0	0	0	0	0	0
JD 2444170.5	635	665	703	748	804	895	1019	1034	1139	1272	1441	1660	0	0	0	0	0	0	0	0	0
1979 OCT 24.0	415	473	536	608	689	792	929	1004	1141	1309	1515	1776	0	0	0	0	0	0	0	0	0
JD 2444160.5	674	712	759	815	887	1264	1065	1170	1311	1490	1722	0	0	0	0	0	0	0	0	0	0
1979 OCT 14.0	466	531	603	685	780	1051	1013	1152	1325	1540	1813	0	0	0	0	0	0	0	0	0	0
JD 2444150.5	720	768	825	896	996	1123	1197	1344	1533	1778	0	0	0	0	0	0	0	0	0	0	0
1979 OCT 4.0	525	598	680	775	891	1039	1160	1338	1560	1844	0	0	0	0	0	0	0	0	0	0	0
JD 2444140.5	775	834	905	993	1381	1223	1373	1570	1828	0	0	0	0	0	0	0	0	0	0	0	2243
1979 SEP 24.0	592	675	771	882	1170	1167	1348	1576	1870	0	0	0	0	0	0	0	0	0	0	0	2056
JD 2444130.5	840	913	1001	1118	1257	1398	1602	1871	0	0	0	0	0	0	0	0	0	0	0	2226	1912
1979 SEP 14.0	670	766	878	1014	1179	1355	1589	1891	0	0	0	0	0	0	0	0	0	0	0	2050	1681
JD 2444120.5	919	1008	1119	1657	1419	1629	1908	0	0	0	0	0	0	0	0	0	0	0	2210	1892	1684
1979 SEP 4.0	761	874	1007	1401	1360	1598	1908	0	0	0	0	0	0	0	0	0	0	0	2044	1673	1407
JD 2444110.5	1014	1126	1269	1439	1651	1939	0	0	0	0	0	0	0	0	0	0	0	0	2194	1873	1659	1533
1979 AUG 25.0	869	1003	1166	1365	1605	1922	0	0	0	0	0	0	0	0	0	0	0	0	2039	1667	1397	1207
JD 2444100.5	1131	1271	1651	1670	1964	0	0	0	0	0	0	0	0	0	0	0	0	2178	1854	1636	1501	1443
1979 AUG 15.0	999	1161	1492	1609	1932	0	0	0	0	0	0	0	0	0	0	0	0	2034	1662	1390	1193	1071
JD 2444090.5	1277	1457	1684	1985	0	0	0	0	0	0	0	0	0	0	0	0	2163	1837	1614	1471	1402	1302
1979 AUG 5.0	1158	1358	1611	1939	0	0	0	0	0	0	0	0	0	0	0	0	2029	1658	1383	1182	1050	819
JD 2444080.5	1461	1696	2001	0	0	0	0	0	0	0	0	0	0	0	0	2148	1821	1593	1443	1364	1357	1238
1979 JUL 26.0	1356	1613	1943	0	0	0	0	0	0	0	0	0	0	0	0	2024	1654	1378	1173	1032	965	777
(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E09

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

	(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
JD 2444200.5		149	166	177	182	178	159	97	-310	368	277	238	210	188	169	153	0	0	0	0	0	0
1979 NOV 23.0		490	570	652	734	816	897	979	1286	1177	1223	1284	1344	1398	1444	1483	0	0	0	0	0	0
JD 2444190.5		150	166	177	181	175	148	29	507	308	258	229	206	187	171	0	0	0	0	0	0	0
1979 NOV 13.0		487	568	649	731	813	895	988	1185	1146	1208	1271	1329	1380	1422	0	0	0	0	0	0	0
JD 2444180.5		151	167	178	181	171	127	-227	354	278	246	224	205	189	0	0	0	0	0	0	0	0
1979 NOV 3.0		484	564	646	728	810	894	1152	1071	1128	1194	1256	1311	1358	0	0	0	0	0	0	0	0
JD 2444170.5		151	167	178	179	163	75	474	299	261	239	221	206	0	0	0	0	0	0	0	0	0
1979 OCT 24.0		480	561	642	724	807	901	1040	1047	1114	1180	1239	1290	0	0	0	0	0	0	0	0	0
JD 2444160.5		152	168	177	176	148	-162	331	274	251	234	220	0	0	0	0	0	0	0	0	0	0
1979 OCT 14.0		476	556	638	720	805	1046	964	1032	1100	1163	1218	0	0	0	0	0	0	0	0	0	0
JD 2444150.5		153	168	177	171	108	417	286	260	244	232	0	0	0	0	0	0	0	0	0	0	0
1979 OCT 4.0		472	552	633	716	810	898	946	1018	1084	1144	0	0	0	0	0	0	0	0	0	0	0
JD 2444140.5		153	168	175	161	-125	302	265	251	241	0	0	0	0	0	0	0	0	0	0	0	138
1979 SEP 24.0		467	547	628	712	965	859	933	1003	1066	0	0	0	0	0	0	0	0	0	0	0	341
JD 2444130.5		154	168	172	130	347	268	254	246	0	0	0	0	0	0	0	0	0	0	0	105	123
1979 SEP 14.0		461	541	622	714	774	847	919	986	0	0	0	0	0	0	0	0	0	0	0	250	298
JD 2444120.5		154	168	165	-124	269	252	247	0	0	0	0	0	0	0	0	0	0	0	69	90	108
1979 SEP 4.0		455	534	617	954	759	834	903	0	0	0	0	0	0	0	0	0	0	0	160	209	254
JD 2444110.5		154	166	143	279	246	244	0	0	0	0	0	0	0	0	0	0	0	33	54	73	91
1979 AUG 25.0		448	527	616	669	748	819	0	0	0	0	0	0	0	0	0	0	0	73	123	168	210
JD 2444100.5		154	163	502	236	235	0	0	0	0	0	0	0	0	0	0	0	-4	17	38	56	73
1979 AUG 15.0		440	520	674	661	734	0	0	0	0	0	0	0	0	0	0	0	3587	38	84	127	166
JD 2444090.5		154	151	222	222	0	0	0	0	0	0	0	0	0	0	0	-41	-19	1	21	38	-221
1979 AUG 5.0		432	515	574	649	0	0	0	0	0	0	0	0	0	0	0	3501	3553	1	45	85	2919
JD 2444080.5		155	213	203	0	0	0	0	0	0	0	0	0	0	0	-77	-55	-34	-14	3	20	-223
1979 JUL 26.0		422	486	565	0	0	0	0	0	0	0	0	0	0	0	3415	3469	3518	3564	5	44	2889
	(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E09

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
JD 2444200.5	35	15	-0	-11	-17	-14	15	345	-181	-143	-135	-136	-141	-148	-156	0	0	0	0	0	0
1979 NOV 23.0	1714	1777	1828	1871	1908	1944	1983	1928	1950	2005	2037	2066	2094	2124	2156	0	0	0	0	0	0
JD 2444190.5	38	20	7	-1	-4	4	75	-235	-133	-119	-118	-122	-129	-138	0	0	0	0	0	0	0
1979 NOV 13.0	1708	1764	1809	1849	1884	1919	1964	1819	1944	1982	2011	2040	2069	2101	0	0	0	0	0	0	0
JD 2444180.5	43	28	17	9	9	30	316	-133	-102	-99	-102	-109	-118	0	0	0	0	0	0	0	0
1979 NOV 3.0	1697	1746	1788	1824	1859	1896	1889	1875	1925	1957	1985	2014	2045	0	0	0	0	0	0	0	0
JD 2444170.5	50	37	27	22	27	80	-175	-88	-79	-81	-88	-97	0	0	0	0	0	0	0	0	0
1979 OCT 24.0	1682	1726	1764	1799	1833	1876	1760	1867	1901	1930	1959	1990	0	0	0	0	0	0	0	0	0
JD 2444160.5	58	47	39	36	50	303	-81	-59	-59	-65	-74	0	0	0	0	0	0	0	0	0	0
1979 OCT 14.0	1663	1703	1739	1772	1807	1821	1802	1845	1876	1904	1934	0	0	0	0	0	0	0	0	0	0
JD 2444150.5	67	58	51	52	92	-106	-41	-37	-42	-51	0	0	0	0	0	0	0	0	0	0	0
1979 OCT 4.0	1641	1678	1712	1744	1785	1707	1788	1820	1849	1879	0	0	0	0	0	0	0	0	0	0	0
JD 2444140.5	78	69	65	73	318	-27	-14	-18	-26	0	0	0	0	0	0	0	0	0	0	0	69
1979 SEP 24.0	1617	1651	1683	1717	1731	1727	1764	1793	1823	0	0	0	0	0	0	0	0	0	0	0	158
JD 2444130.5	89	82	80	109	-32	6	5	-1	0	0	0	0	0	0	0	0	0	0	0	48	70
1979 SEP 14.0	1590	1622	1653	1692	1650	1707	1737	1766	0	0	0	0	0	0	0	0	0	0	0	109	158
JD 2444120.5	101	95	98	383	26	30	23	0	0	0	0	0	0	0	0	0	0	0	27	48	73
1979 SEP 4.0	1560	1591	1623	1588	1648	1680	1709	0	0	0	0	0	0	0	0	0	0	0	61	108	166
JD 2444110.5	113	109	128	38	54	49	0	0	0	0	0	0	0	0	0	0	0	4	25	50	81
1979 AUG 25.0	1529	1559	1594	1583	1623	1652	0	0	0	0	0	0	0	0	0	0	0	11	57	114	185
JD 2444100.5	125	124	-57	77	74	0	0	0	0	0	0	0	0	0	0	0	-17	2	26	57	94
1979 AUG 15.0	1495	1525	1386	1564	1593	0	0	0	0	0	0	0	0	0	0	0	3561	5	60	129	214
JD 2444090.5	137	145	99	99	0	0	0	0	0	0	0	0	0	0	0	-40	-21	1	32	69	219
1979 AUG 5.0	1460	1492	1503	1533	0	0	0	0	0	0	0	0	0	0	0	3510	3553	6	73	157	659
JD 2444080.5	148	115	124	0	0	0	0	0	0	0	0	0	0	0	-63	-45	-23	5	42	84	217
1979 JUL 26.0	1423	1438	1472	0	0	0	0	0	0	0	0	0	0	0	3458	3500	3551	16	98	194	650

(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)

JD2444000.5 1979 MAY 7.0

JD2444040.5 1979 JUN 16.0

JD2444080.5 1979 JUL 26.0

JD2444120.5 1979 SEP 4.0

JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E09

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

	(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
JD 2444200.5 1979 NOV 23.0		1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	0	0	0	0	0	0
JD 2444190.5 1979 NOV 13.0		1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	0	0	0	0	0	0	0
JD 2444180.5 1979 NOV 3.0		1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	0	0	0	0	0	0	0	0
JD 2444170.5 1979 OCT 24.0		1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	0	0	0	0	0	0	0	0	0
JD 2444160.5 1979 OCT 14.0		1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	0	0	0	0	0	0	0	0	0	0
JD 2444150.5 1979 OCT 4.0		1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	0	0	0	0	0	0	0	0	0	0	0
JD 2444140.5 1979 SEP 24.0		1777	1777	1777	1777	1777	1777	1777	1777	1777	0	0	0	0	0	0	0	0	0	0	0	1777
JD 2444130.5 1979 SEP 14.0		1840	1840	1840	1840	1840	1840	1840	1840	0	0	0	0	0	0	0	0	0	0	0	1840	1840
JD 2444120.5 1979 SEP 4.0		1897	1897	1897	1897	1897	1897	1897	0	0	0	0	0	0	0	0	0	0	0	1897	1897	1897
JD 2444110.5 1979 AUG 25.0		1950	1950	1950	1950	1950	1950	0	0	0	0	0	0	0	0	0	0	0	0	1950	1950	1950	1950
JD 2444100.5 1979 AUG 15.0		1998	1998	1998	1998	1998	0	0	0	0	0	0	0	0	0	0	0	0	1998	1998	1998	1998	1998
JD 2444090.5 1979 AUG 5.0		2041	2041	2041	2041	0	0	0	0	0	0	0	0	0	0	0	2041	2041	2041	2041	2041	2041	2041
JD 2444080.5 1979 JUL 26.0		2080	2080	2080	0	0	0	0	0	0	0	0	0	0	0	2080	2080	2080	2080	2080	2080	2080	2080
	(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)

JD2444000.5
1979 MAY 7.0

JD2444040.5
1979 JUN 16.0

JD2444080.5
1979 JUL 26.0

JD2444120.5
1979 SEP 4.0

JD2444160.5
1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E09

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
JD 2444200.5	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	0	0	0	0	0	0
1979 NOV 23.0	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	0	0	0	0	0	0
JD 2444190.5	375	375	375	375	375	375	375	375	375	375	375	375	375	375	0	0	0	0	0	0	0
1979 NOV 13.0	832	832	832	832	832	832	832	832	832	832	832	832	832	832	0	0	0	0	0	0	0
JD 2444180.5	372	372	372	372	372	372	372	372	372	372	372	372	372	0	0	0	0	0	0	0	0
1979 NOV 3.0	781	781	781	781	781	781	781	781	781	781	781	781	781	0	0	0	0	0	0	0	0
JD 2444170.5	367	367	367	367	367	367	367	367	367	367	367	367	0	0	0	0	0	0	0	0	0
1979 OCT 24.0	734	734	734	734	734	734	734	734	734	734	734	734	0	0	0	0	0	0	0	0	0
JD 2444160.5	360	360	360	360	360	360	360	360	360	360	360	0	0	0	0	0	0	0	0	0	0
1979 OCT 14.0	690	690	690	690	690	690	690	690	690	690	690	0	0	0	0	0	0	0	0	0	0
D 2444150.5	352	352	352	352	352	352	352	352	352	352	0	0	0	0	0	0	0	0	0	0	0
979 OCT 4.0	648	648	648	648	648	648	648	648	648	648	0	0	0	0	0	0	0	0	0	0	0
D 2444140.5	342	342	342	342	342	342	342	342	342	0	0	0	0	0	0	0	0	0	0	0	342
979 SEP 24.0	609	609	609	609	609	609	609	609	609	0	0	0	0	0	0	0	0	0	0	0	609
D 2444130.5	331	331	331	331	331	331	331	331	0	0	0	0	0	0	0	0	0	0	0	331	331
979 SEP 14.0	572	572	572	572	572	572	572	572	0	0	0	0	0	0	0	0	0	0	0	572	572
D 2444120.5	320	320	320	320	320	320	320	0	0	0	0	0	0	0	0	0	0	0	320	320	320
979 SEP 4.0	537	537	537	537	537	537	537	0	0	0	0	0	0	0	0	0	0	0	537	537	537
D 2444110.5	308	308	308	308	308	308	0	0	0	0	0	0	0	0	0	0	0	0	308	308	308
979 AUG 25.0	505	505	505	505	505	505	0	0	0	0	0	0	0	0	0	0	0	0	505	505	505
D 2444100.5	296	296	296	296	296	0	0	0	0	0	0	0	0	0	0	0	0	296	296	296	296
979 AUG 15.0	473	473	473	473	473	0	0	0	0	0	0	0	0	0	0	0	0	473	473	473	473
D 2444090.5	283	283	283	283	0	0	0	0	0	0	0	0	0	0	0	283	283	283	283	283	283
979 AUG 5.0	444	444	444	444	0	0	0	0	0	0	0	0	0	0	0	444	444	444	444	444	444
D 2444080.5	270	270	270	0	0	0	0	0	0	0	0	0	0	0	270	270	270	270	270	270	270
979 JUL 26.0	416	416	416	0	0	0	0	0	0	0	0	0	0	0	416	416	416	416	416	416	416
(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E09

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

	(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
JD 2444200.5		2480	2384	2288	2192	2097	2001	1907	1819	1713	1618	1523	1427	1330	1233	1135	0	0	0	0	0	0
1979 NOV 23.0		-1006	-971	-936	-901	-864	-827	-789	-754	-706	-665	-622	-577	-530	-480	-428	0	0	0	0	0	0
JD 2444190.5		2434	2338	2242	2146	2050	1955	1861	1760	1667	1572	1476	1380	1284	1187	0	0	0	0	0	0	0
1979 NOV 13.0		-1000	-966	-930	-894	-857	-819	-781	-737	-698	-655	-611	-565	-517	-466	0	0	0	0	0	0	0
JD 2444160.5		2388	2291	2195	2099	2004	1909	1820	1716	1621	1526	1430	1334	1237	0	0	0	0	0	0	0	0
1979 NOV 3.0		-994	-959	-923	-886	-849	-811	-775	-729	-687	-644	-599	-552	-502	0	0	0	0	0	0	0	0
JD 2444170.5		2340	2244	2148	2052	1956	1862	1762	1669	1574	1478	1383	1286	0	0	0	0	0	0	0	0	0
1979 OCT 24.0		-987	-952	-915	-878	-840	-801	-758	-718	-675	-631	-585	-537	0	0	0	0	0	0	0	0	0
JD 2444160.5		2292	2196	2100	2004	1909	1818	1716	1621	1526	1430	1335	0	0	0	0	0	0	0	0	0	0
1979 OCT 14.0		-979	-943	-906	-868	-829	-792	-747	-705	-662	-617	-569	0	0	0	0	0	0	0	0	0	0
JD 2444150.5		2243	2147	2051	1955	1860	1762	1668	1573	1477	1382	0	0	0	0	0	0	0	0	0	0	0
1979 OCT 4.0		-970	-933	-896	-857	-818	-775	-734	-692	-647	-601	0	0	0	0	0	0	0	0	0	0	0
JD 2444140.5		2194	2097	2001	1906	1815	1714	1619	1523	1428	0	0	0	0	0	0	0	0	0	0	0	3348
1979 SEP 24.0		-960	-923	-884	-845	-807	-762	-720	-676	-631	0	0	0	0	0	0	0	0	0	0	0	-1679
JD 2444130.5		2144	2047	1951	1856	1758	1664	1569	1473	0	0	0	0	0	0	0	0	0	0	0	3298	3398
1979 SEP 14.0		-949	-911	-872	-832	-789	-748	-704	-659	0	0	0	0	0	0	0	0	0	0	0	-1655	-1706
JD 2444120.5		2093	1996	1900	1809	1708	1613	1518	0	0	0	0	0	0	0	0	0	0	0	0	3248	3349	3449
1979 SEP 4.0		-937	-897	-858	-819	-774	-731	-687	0	0	0	0	0	0	0	0	0	0	0	0	-1632	-1683	-1732
JD 2444110.5		2041	1944	1848	1752	1656	1561	0	0	0	0	0	0	0	0	0	0	0	0	3200	3300	3401	3501
1979 AUG 25.0		-923	-883	-842	-800	-757	-713	0	0	0	0	0	0	0	0	0	0	0	0	-1609	-1660	-1710	-1758
JD 2444100.5		1988	1891	1793	1699	1604	0	0	0	0	0	0	0	0	0	0	0	0	3154	3253	3353	3453	3554
1979 AUG 15.0		-908	-867	-824	-783	-739	0	0	0	0	0	0	0	0	0	0	0	0	-1586	-1638	-1689	-1738	-1781
JD 2444090.5		1934	1838	1741	1646	0	0	0	0	0	0	0	0	0	0	0	0	3109	3208	3307	3407	3507	9
1979 AUG 5.0		-891	-850	-807	-764	0	0	0	0	0	0	0	0	0	0	0	0	-1565	-1617	-1668	-1718	-1763	1799
JD 2444080.5		1880	1783	1687	0	0	0	0	0	0	0	0	0	0	0	0	3065	3164	3262	3362	3461	3562	63
1979 JUL 26.0		-874	-831	-788	0	0	0	0	0	0	0	0	0	0	0	0	-1544	-1596	-1647	-1698	-1746	-1786	1787
	(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E09

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

	(FLT T)(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
JD 2444200.5	180	196	222	264	338	485	906	5898	1111	536	359	275	228	200	182	0	0	0	0	0	0
1979 NOV 23.0	521	539	564	597	640	694	763	851	961	1106	1296	1554	1910	2420	3181	0	0	0	0	0	0
JD 2444190.5	179	198	230	282	378	599	1516	2388	699	414	299	239	204	182	0	0	0	0	0	0	0
1979 NOV 13.0	542	566	598	640	694	761	848	958	1102	1292	1551	1912	2433	3220	0	0	0	0	0	0	0
JD 2444180.5	178	201	239	305	437	807	5079	1042	495	330	252	209	183	0	0	0	0	0	0	0	0
1979 NOV 3.0	568	599	640	692	758	843	952	1094	1283	1540	1901	2428	3231	0	0	0	0	0	0	0	0
JD 2444170.5	176	204	250	336	530	1332	2222	630	371	268	214	183	0	0	0	0	0	0	0	0	0
1979 OCT 24.0	600	639	689	754	837	943	1083	1269	1522	1881	2407	3215	0	0	0	0	0	0	0	0	0
JD 2444160.5	175	208	265	380	704	4691	910	431	286	220	182	0	0	0	0	0	0	0	0	0	0
1979 OCT 14.0	637	686	749	829	933	1069	1251	1500	1852	2372	3177	0	0	0	0	0	0	0	0	0	0
JD 2444150.5	173	212	285	452	1158	1843	529	313	227	181	0	0	0	0	0	0	0	0	0	0	0
1979 OCT 4.0	682	743	821	922	1054	1231	1473	1817	2326	3119	0	0	0	0	0	0	0	0	0	0	0
JD 2444140.5	171	218	315	591	4822	723	348	233	179	0	0	0	0	0	0	0	0	0	0	0	255
1979 SEP 24.0	736	812	909	1037	1207	1443	1777	2271	3047	0	0	0	0	0	0	0	0	0	0	0	1014
JD 2444130.5	168	227	364	979	1318	403	241	176	0	0	0	0	0	0	0	0	0	0	0	188	275
1979 SEP 14.0	802	897	1020	1185	1412	1733	2211	2962	0	0	0	0	0	0	0	0	0	0	0	1020	1005
JD 2444120.5	164	239	462	6337	504	250	170	0	0	0	0	0	0	0	0	0	0	0	139	189	309
1979 SEP 4.0	883	1002	1161	1376	1688	2146	2869	0	0	0	0	0	0	0	0	0	0	0	1027	1008	1000
JD 2444110.5	159	261	772	773	262	160	0	0	0	0	0	0	0	0	0	0	0	101	130	190	379
1979 AUG 25.0	984	1137	1345	1641	2079	2770	0	0	0	0	0	0	0	0	0	0	0	1035	1011	1000	998
JD 2444100.5	151	306	4534	278	145	0	0	0	0	0	0	0	0	0	0	0	69	86	117	192	609
1979 AUG 15.0	1112	1312	1595	2011	2669	0	0	0	0	0	0	0	0	0	0	0	1043	1014	999	996	999
JD 2444090.5	137	483	311	119	0	0	0	0	0	0	0	0	0	0	0	42	50	65	96	197	2158
1979 AUG 5.0	1279	1547	1944	2567	0	0	0	0	0	0	0	0	0	0	0	1052	1018	999	992	996	1000
JD 2444080.5	103	480	73	0	0	0	0	0	0	0	0	0	0	0	18	21	26	35	60	214	131
1979 JUL 26.0	1502	1878	2466	0	0	0	0	0	0	0	0	0	0	0	1062	1023	999	989	991	999	993
	(FLT T)(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E09

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

	(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
JD 2444200.5		599	613	624	634	644	652	661	666	682	693	707	724	744	769	799	0	0	0	0	0	0
1979 NOV 23.0		-1901	-2042	-2236	-2513	-2930	-3616	-4918	-8277	-9999	-9999	-9999	-9999	-9999	-9999	-9999	0	0	0	0	0	0
JD 2444190.5		592	603	613	622	630	638	646	658	667	679	694	712	736	765	0	0	0	0	0	0	0
1979 NOV 13.0		-1993	-2177	-2440	-2836	-3484	-4710	-7832	-9999	-9999	-9999	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0
JD 2444180.5		583	593	601	609	616	623	628	641	651	664	681	703	730	0	0	0	0	0	0	0	0
1979 NOV 3.0		-2116	-2364	-2736	-3342	-4479	-7310	-9999	-9999	-9999	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0
JD 2444170.5		573	581	588	595	601	607	617	625	636	651	670	696	0	0	0	0	0	0	0	0	0
1979 OCT 24.0		-2287	-2634	-3195	-4236	-6756	-9999	-9999	-9999	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0
JD 2444160.5		561	568	574	580	585	589	600	609	621	638	662	0	0	0	0	0	0	0	0	0	0
1979 OCT 14.0		-2531	-3048	-3992	-6204	-9999	-9999	-9999	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0
JD 2444150.5		549	554	559	564	568	576	583	593	608	629	0	0	0	0	0	0	0	0	0	0	0
1979 OCT 4.0		-2903	-3753	-5677	-9999	-9999	-9999	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0
JD 2444140.5		535	539	543	547	549	558	566	578	596	0	0	0	0	0	0	0	0	0	0	0	6
1979 SEP 24.0		-3525	-5189	-9999	-9999	-9999	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	0-9999
JD 2444130.5		521	523	526	529	534	540	550	565	0	0	0	0	0	0	0	0	0	0	0	9	6
1979 SEP 14.0		-4746	-9593	-9999	-9999	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	0-9999	-9999
JD 2444120.5		505	506	508	508	516	523	536	0	0	0	0	0	0	0	0	0	0	0	0	13	10	5
1979 SEP 4.0		-8154	-9999	-9999	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	0-9999	-9999	-9999
JD 2444110.5		488	488	490	493	498	507	0	0	0	0	0	0	0	0	0	0	0	0	16	14	9	3
1979 AUG 25.0		-9999	-9999	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	0-9999	-9999	-9999	-3569	
JD 2444100.5		470	469	471	474	481	0	0	0	0	0	0	0	0	0	0	0	0	21	19	14	8	1
1979 AUG 15.0		-9999	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	0-9999	-9999	-9999	-3496	-2225	
JD 2444090.5		450	450	451	455	0	0	0	0	0	0	0	0	0	0	0	0	25	24	20	13	5	0
1979 AUG 5.0		-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	0-9999	-9999	-9999	-3463	-2190	1529	
JD 2444080.5		430	429	431	0	0	0	0	0	0	0	0	0	0	0	0	30	30	27	20	10	1	-4
1979 JUL 26.0		-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	0-9999	-9999	-9999	-3463	-2172	-1769	1543	
	(ELT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

MIS E09

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
JD 2444200.5	264	249	235	221	207	193	179	166	150	136	121	106	92	77	63	0	0	0	0	0	0
1979 NOV 23.0	219	208	197	186	175	164	153	142	130	119	107	95	84	72	60	0	0	0	0	0	0
JD 2444190.5	259	244	230	216	201	187	173	157	143	128	113	97	82	67	0	0	0	0	0	0	0
1979 NOV 13.0	212	201	190	179	167	156	145	133	122	110	98	86	74	62	0	0	0	0	0	0	0
JD 2444180.5	253	239	224	210	195	181	167	150	135	119	103	87	71	0	0	0	0	0	0	0	0
1979 NOV 3.0	204	193	182	171	159	148	137	124	112	100	88	76	64	0	0	0	0	0	0	0	0
JD 2444170.5	248	233	219	204	189	174	158	142	126	110	93	76	0	0	0	0	0	0	0	0	0
1979 OCT 24.0	196	185	174	162	151	139	127	115	103	91	78	66	0	0	0	0	0	0	0	0	0
JD 2444160.5	243	228	213	197	182	167	150	133	116	99	81	0	0	0	0	0	0	0	0	0	0
1979 OCT 14.0	188	177	165	154	142	130	118	106	93	81	68	0	0	0	0	0	0	0	0	0	0
JD 2444150.5	237	222	206	191	175	158	141	123	105	87	0	0	0	0	0	0	0	0	0	0	0
1979 OCT 4.0	180	168	157	145	133	121	108	96	83	70	0	0	0	0	0	0	0	0	0	0	0
JD 2444140.5	231	215	199	183	167	149	131	112	93	0	0	0	0	0	0	0	0	0	0	0	2998
1979 SEP 24.0	171	160	148	136	124	111	98	85	72	0	0	0	0	0	0	0	0	0	0	0	156
JD 2444130.5	225	208	192	175	157	139	120	100	0	0	0	0	0	0	0	0	0	0	0	2444	3058
1979 SEP 14.0	163	151	139	126	114	101	88	74	0	0	0	0	0	0	0	0	0	0	0	155	170
JD 2444120.5	218	201	184	167	147	128	107	0	0	0	0	0	0	0	0	0	0	0	2058	2409	3384
1979 SEP 4.0	154	142	129	117	104	90	77	0	0	0	0	0	0	0	0	0	0	0	155	170	184
JD 2444110.5	211	193	175	156	136	115	0	0	0	0	0	0	0	0	0	0	0	0	1774	1985	2514	4294
1979 AUG 25.0	144	132	119	106	93	79	0	0	0	0	0	0	0	0	0	0	0	0	154	169	183	196
JD 2444100.5	203	184	164	144	123	0	0	0	0	0	0	0	0	0	0	0	0	1557	1688	2002	2846	7721
1979 AUG 15.0	135	122	109	95	82	0	0	0	0	0	0	0	0	0	0	0	0	153	168	183	196	208
JD 2444090.5	194	174	153	131	0	0	0	0	0	0	0	0	0	0	0	0	1387	1469	1666	2134	3752	59
1979 AUG 5.0	125	112	98	84	0	0	0	0	0	0	0	0	0	0	0	0	152	168	182	196	208	80
JD 2444080.5	184	163	140	0	0	0	0	0	0	0	0	0	0	0	0	1249	1301	1431	1715	2485	7666	63
1979 JUL 26.0	114	100	86	0	0	0	0	0	0	0	0	0	0	0	0	151	167	181	195	208	219	86
(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E09

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
JD 2444200.5 1979 NOV 23.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0
JD 2444190.5 1979 NOV 13.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0
JD 2444180.5 1979 NOV 3.0	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0
JD 2444170.5 1979 OCT 24.0	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0
JD 2444160.5 1979 OCT 14.0	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0
JD 2444150.5 1979 OCT 4.0	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0
JD 2444140.5 1979 SEP 24.0	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524
JD 2444130.5 1979 SEP 14.0	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524
JD 2444120.5 1979 SEP 4.0	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524
JD 2444110.5 1979 AUG 25.0	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524
JD 2444100.5 1979 AUG 15.0	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524
JD 2444090.5 1979 AUG 5.0	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524
JD 2444080.5 1979 JUL 26.0	772	772	772	0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524

(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E09

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)
JD 2444200.5	1204	1232	1274	1329	1400	1490	1625	3151	1904	2019	2214	2456	2756	3134	3630	0	0	0	0	0	0
1979 NOV 23.0	672	781	906	1045	1201	1376	1584	2637	2053	2292	2599	2961	3390	3911	4565	0	0	0	0	0	0
JD 2444190.5	1260	1303	1361	1434	1526	1645	1880	2195	2112	2316	2580	2909	3325	3868	0	0	0	0	0	0	0
1979 NOV 13.0	765	890	1031	1189	1366	1567	1844	2203	2325	2641	3020	3473	4027	4723	0	0	0	0	0	0	0
JD 2444180.5	1329	1388	1464	1559	1677	1838	3040	2214	2409	2692	3048	3499	4089	0	0	0	0	0	0	0	0
1979 NOV 3.0	872	1014	1174	1354	1556	1794	2660	2361	2674	3068	3544	4127	4864	0	0	0	0	0	0	0	0
JD 2444170.5	1412	1491	1589	1709	1861	2108	2453	2495	2791	3172	3657	4290	0	0	0	0	0	0	0	0	0
1979 OCT 24.0	997	1158	1340	1545	1780	2081	2482	2702	3108	3603	4214	4988	0	0	0	0	0	0	0	0	0
JD 2444160.5	1513	1614	1738	1890	2088	3148	2582	2880	3282	3798	4473	0	0	0	0	0	0	0	0	0	0
1979 OCT 14.0	1140	1324	1532	1768	2045	2842	2730	3138	3651	4287	5096	0	0	0	0	0	0	0	0	0	0
JD 2444150.5	1634	1762	1917	2110	2389	2746	2958	3378	3922	4636	0	0	0	0	0	0	0	0	0	0	0
1979 OCT 4.0	1306	1516	1755	2031	2372	2808	3162	3689	4347	5189	0	0	0	0	0	0	0	0	0	0	0
JD 2444140.5	1781	1940	2136	2382	3482	3030	3461	4030	4780	0	0	0	0	0	0	0	0	0	0	0	5249
1979 SEP 24.0	1499	1741	2019	2345	3194	3183	3718	4396	5266	0	0	0	0	0	0	0	0	0	0	0	5820
JD 2444130.5	1958	2158	2403	2734	3127	3532	4123	4906	0	0	0	0	0	0	0	0	0	0	0	5199	4278
1979 SEP 14.0	1725	2006	2332	2732	3221	3739	4433	5330	0	0	0	0	0	0	0	0	0	0	0	5801	4705
JD 2444120.5	2175	2424	2735	4282	3593	4202	5014	0	0	0	0	0	0	0	0	0	0	0	5151	4219	3614
1979 SEP 4.0	1991	2320	2711	3875	3754	4461	5381	0	0	0	0	0	0	0	0	0	0	0	5783	4684	3893
JD 2444110.5	2441	2754	3162	3651	4267	5105	0	0	0	0	0	0	0	0	0	0	0	5104	4162	3541	3173
1979 AUG 25.0	2307	2700	3180	3768	4481	5421	0	0	0	0	0	0	0	0	0	0	0	5767	4666	3865	3303
JD 2444100.5	2769	3169	4264	4319	5180	0	0	0	0	0	0	0	0	0	0	0	0	5058	4109	3472	3081	2914
1979 AUG 15.0	2688	3166	4147	4493	5450	0	0	0	0	0	0	0	0	0	0	0	0	5753	4651	3842	3262	2901
JD 2444090.5	3184	3703	4361	5241	0	0	0	0	0	0	0	0	0	0	0	0	0	5014	4058	3409	2995	2796	2510
1979 AUG 5.0	3156	3750	4500	5470	0	0	0	0	0	0	0	0	0	0	0	0	0	5738	4637	3824	3229	2839	2160
JD 2444080.5	3715	4395	5289	0	0	0	0	0	0	0	0	0	0	0	0	0	4971	4011	3349	2915	2686	2667	2327
1979 JUL 26.0	3742	4504	5484	0	0	0	0	0	0	0	0	0	0	0	0	0	5724	4625	3809	3202	2787	2587	2038
(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E11

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2444200.5	-274	-349	-458	-683	524	266	146	102	89	91	102	119	138	158	178	197	214	228	239	246	249
1979 NOV 23.0	3562	3545	3583	257	2830	3263	3379	3455	3523	3588	54	120	187	256	326	396	465	532	593	643	677
JD 2444190.5	-286	-386	-545	-709	403	200	118	87	80	85	97	114	134	154	174	193	210	224	234	240	241
1979 NOV 13.0	13	6	96	1411	3131	3315	3399	3466	3529	3592	55	120	186	253	321	389	455	518	574	616	639
JD 2444180.5	-302	-437	-662	564	292	153	95	74	71	78	92	109	129	149	169	188	205	218	227	232	231
1979 NOV 3.0	64	81	346	2783	3243	3349	3416	3475	3534	3594	56	119	183	249	315	381	444	503	552	584	595
JD 2444170.5	-327	-511	-679	436	214	117	76	62	62	71	86	104	124	144	164	183	199	211	219	222	219
1979 OCT 24.0	116	189	1273	3131	3303	3373	3429	3483	3538	3596	56	117	180	244	309	372	431	484	525	546	546
JD 2444160.5	-367	-616	602	312	157	88	59	50	53	64	80	98	118	139	158	176	192	203	209	209	0
1979 OCT 14.0	175	408	2805	3257	3342	3392	3439	3489	3541	3597	55	115	176	239	301	361	416	462	493	502	0
JD 2444150.5	-433	-638	453	221	114	64	43	39	44	56	73	92	112	132	152	169	183	193	196	192	-163
1979 OCT 4.0	256	1197	3186	3323	3369	3407	3447	3493	3543	3597	53	112	172	232	291	347	398	436	455	451	3187
JD 2444140.5	-544	627	312	154	78	42	28	27	35	48	65	85	105	125	144	161	173	180	180	173	-167
1979 SEP 24.0	423	2938	3317	3365	3389	3418	3453	3496	3544	3596	51	107	165	224	280	332	375	404	410	396	3173
JD 2444130.5	-584	432	210	103	48	22	13	16	25	40	57	77	97	117	135	151	161	165	160	-190	-171
1979 SEP 14.0	1184	3306	3383	3393	3404	3425	3457	3497	3543	3593	47	102	158	214	267	313	349	365	358	3084	3158
JD 2444120.5	595	274	135	61	22	3	-0	4	15	30	49	69	89	108	126	139	147	146	137	-193	-174
1979 SEP 4.0	3199	3423	3422	3411	3413	3430	3458	3496	3541	3590	41	95	149	202	251	291	316	318	300	3069	3144
JD 2444110.5	340	167	78	26	-2	-14	-14	-7	4	21	40	59	79	98	114	125	128	122	-211	-196	-178
1979 AUG 25.0	3468	3477	3445	3423	3418	3431	3458	3494	3537	3584	35	87	139	188	231	263	276	264	2978	3054	3129
JD 2444100.5	186	92	32	-4	-24	-31	-29	-19	-6	11	30	50	69	87	100	108	106	0	-213	-199	-181
1979 AUG 15.0	3545	3503	3457	3427	3419	3430	3455	3490	3532	3578	27	77	126	171	208	229	227	0	2962	3039	3115
JD 2444090.5	93	36	-5	-33	-46	-48	-43	-32	-17	0	19	39	57	73	84	87	78	-226	-215	-201	-184
1979 AUG 5.0	3574	3514	3460	3426	3416	3426	3450	3484	3525	3570	17	65	111	151	179	187	169	2868	2947	3024	3100
JD 2444080.5	30	-8	-39	-59	-67	-66	-58	-45	-29	-11	8	27	44	58	65	61	0	-227	-217	-204	-187
1979 JUL 26.0	3582	3514	3456	3420	3410	3419	3442	3476	3516	3560	6	51	93	126	142	134	0	2852	2931	3009	3085

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)

JD2444400.5	JD2444440.5	JD2444480.5	JD2444520.5	JD2444560.5
1980 JUN 10.0	1980 JUL 20.0	1980 AUG 29.0	1980 OCT 8.0	1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E11

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

	(FLT T)(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2444200.5	210	252	337	583	-318	-89	6	57	93	121	145	162	168	162	145	124	105	91	83	82	91
1979 NOV 23.0	376	373	362	305	739	584	584	616	667	737	832	952	1094	1242	1377	1487	1569	1625	1659	1670	1654
JD 2444190.5	220	279	418	806	-203	-52	17	60	93	121	143	159	163	155	140	123	108	98	95	99	114
1979 NOV 13.0	360	351	319	697	603	561	579	619	679	760	866	995	1139	1278	1399	1492	1561	1605	1628	1627	1596
JD 2444180.5	238	326	573	-349	-129	-29	24	62	93	120	142	155	157	149	137	124	114	108	109	119	138
1979 NOV 3.0	346	324	240	726	557	552	580	629	699	791	906	1041	1180	1307	1411	1490	1546	1579	1591	1576	1530
JD 2444170.5	267	411	808	-238	-86	-15	30	65	95	121	141	152	153	146	137	128	122	121	126	141	164
1979 OCT 24.0	332	286	401	585	538	552	590	648	727	829	951	1084	1214	1326	1415	1481	1525	1547	1546	1516	1453
JD 2444160.5	317	570	-371	-158	-59	-3	35	68	98	123	141	150	151	146	139	134	132	135	145	165	0
1979 OCT 14.0	317	203	703	543	535	561	608	676	764	873	996	1123	1239	1336	1410	1464	1497	1508	1493	1446	0
JD 2444150.5	406	802	-255	-108	-38	6	41	73	101	125	141	149	150	147	144	142	144	151	166	189	170
1979 OCT 4.0	290	241	577	531	543	579	635	711	806	918	1037	1153	1254	1337	1399	1441	1463	1462	1431	1365	1349
JD 2444140.5	574	-378	-167	-74	-21	16	49	80	107	128	143	150	152	151	151	152	157	169	188	212	181
1979 SEP 24.0	210	677	545	538	562	606	670	752	850	960	1071	1174	1261	1330	1380	1411	1422	1406	1357	1273	1312
JD 2444130.5	795	-243	-110	-46	-5	28	59	88	113	132	145	152	155	157	159	163	173	188	210	197	190
1979 SEP 14.0	219	583	546	557	589	641	710	795	893	996	1096	1184	1258	1315	1354	1375	1373	1340	1270	1249	1273
JD 2444120.5	-350	-146	-67	-21	12	42	70	97	119	137	149	156	161	164	169	176	189	208	230	205	199
1979 SEP 4.0	659	570	565	585	625	681	753	837	930	1023	1110	1186	1247	1293	1322	1331	1313	1260	1170	1209	1234
JD 2444110.5	-184	-79	-30	2	30	57	83	106	127	142	153	161	167	172	180	190	206	226	218	213	207
1979 AUG 25.0	610	585	593	621	664	722	793	874	958	1041	1115	1179	1229	1265	1283	1278	1242	1166	1144	1169	1194
JD 2444100.5	-79	-27	2	26	50	73	95	116	134	148	159	167	174	182	191	205	223	0	224	220	214
1979 AUG 15.0	617	613	628	659	704	761	829	902	977	1048	1111	1164	1204	1229	1235	1214	1155	0	1102	1127	1152
JD 2444090.5	-9	14	32	50	69	88	108	126	141	154	165	174	182	191	203	219	236	233	229	225	221
1979 AUG 5.0	641	645	663	695	739	793	855	921	985	1046	1099	1142	1172	1186	1178	1137	1052	1034	1059	1084	1109
JD 2444080.5	40	49	59	72	87	103	119	135	149	161	171	181	190	201	215	231	0	236	233	230	226
1979 JUL 26.0	667	675	695	726	767	817	872	929	984	1035	1079	1112	1133	1134	1108	1042	0	990	1015	1040	1064

	(FLT T)(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD2444400.5																					
1980 JUN 10.0																					
JD2444440.5																					
1980 JUL 20.0																					
JD2444480.5																					
1980 AUG 29.0																					
JD2444520.5																					
1980 OCT 8.0																					
JD2444560.5																					
1980 NOV 17.0																					

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M15 E11

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2444200.5 1979 NOV 23.0	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311
JD 2444190.5 1979 NOV 13.0	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398	1398
JD 2444180.5 1979 NOV 3.0	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482	1482
JD 2444170.5 1979 OCT 24.0	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562	1562
JD 2444160.5 1979 OCT 14.0	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	0
JD 2444150.5 1979 OCT 4.0	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710	1710
JD 2444140.5 1979 SEP 24.0	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777	1777
JD 2444130.5 1979 SEP 14.0	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840
JD 2444120.5 1979 SEP 4.0	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897	1897
JD 2444110.5 1979 AUG 25.0	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
JD 2444100.5 1979 AUG 15.0	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998	0	1998	1998	1998
JD 2444090.5 1979 AUG 5.0	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041	2041
JD 2444080.5 1979 JUL 26.0	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	0	2080	2080	2080	2080	2080

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)

JD2444400.5 1980 JUN 10.0 JD2444440.5 1980 JUL 20.0 JD2444480.5 1980 AUG 29.0 JD2444520.5 1980 OCT 8.0 JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E11

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2444200.5	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375
1979 NOV 23.0	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887
JD 2444190.5	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375
1979 NOV 13.0	832	832	832	832	832	832	832	832	832	832	832	832	832	832	832	832	832	832	832	832	832
JD 2444180.5	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372
1979 NOV 3.0	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781
JD 2444170.5	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367
1979 OCT 24.0	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734	734
JD 2444160.5	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	0
1979 OCT 14.0	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690	690	0
JD 2444150.5	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352
1979 OCT 4.0	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648	648
JD 2444140.5	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342
1979 SEP 24.0	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609	609
JD 2444130.5	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331	331
1979 SEP 14.0	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572
JD 2444120.5	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320	320
1979 SEP 4.0	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537
JD 2444110.5	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308
1979 AUG 25.0	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505
JD 2444100.5	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296	0	296	296	296
1979 AUG 15.0	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473	473	0	473	473	473
JD 2444090.5	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283	283
1979 AUG 5.0	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444	444
JD 2444080.5	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	270	0	270	270	270	270
1979 JUL 26.0	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	416	0	416	416	416	416

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)

JD2444400.5
1980 JUN 10.0

JD2444440.5
1980 JUL 20.0

JD2444480.5
1980 AUG 29.0

JD2444520.5
1980 OCT 8.0

JD2444560.5
1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E11

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

	(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2444200.5		1453	1549	1644	1738	1839	1932	2027	2123	2219	2316	2413	2511	2610	2709	2808	2908	3009	3110	3211	3312	3414
1979 NOV 23.0		-1412	-1430	-1454	-1484	-1516	-1554	-1595	-1638	-1682	-1727	-1774	1779	1733	1689	1647	1608	1576	1552	1543	1557	1605
JD 2444190.5		1499	1595	1690	1779	1883	1978	2073	2169	2265	2362	2460	2557	2656	2755	2854	2954	3055	3156	3257	3359	3460
1979 NOV 13.0		-1479	-1494	-1516	-1546	-1574	-1609	-1648	-1688	-1731	-1774	1781	1736	1693	1651	1612	1578	1550	1534	1536	1565	1635
JD 2444180.5		1546	1641	1736	1836	1929	2024	2120	2216	2312	2409	2506	2604	2703	2802	2901	3001	3102	3203	3304	3405	3507
1979 NOV 3.0		-1545	-1558	-1578	-1600	-1630	-1663	-1700	-1738	-1779	1779	1737	1695	1654	1615	1579	1549	1528	1521	1536	1584	1678
JD 2444170.5		1593	1689	1779	1881	1976	2071	2167	2263	2359	2456	2554	2651	2750	2849	2948	3048	3149	3250	3351	3453	3553
1979 OCT 24.0		-1610	-1621	-1640	-1659	-1686	-1717	-1751	-1788	1773	1734	1694	1654	1616	1580	1549	1524	1510	1513	1544	1616	1734
JD 2444160.5		1641	1736	1835	1929	2024	2119	2215	2311	2407	2504	2602	2699	2798	2897	2996	3096	3197	3298	3399	3500	0
1979 OCT 14.0		-1673	-1682	-1694	-1716	-1741	-1770	1797	1763	1727	1689	1652	1615	1580	1547	1520	1502	1497	1513	1564	1662	0
JD 2444150.5		1690	1782	1882	1977	2073	2168	2264	2360	2456	2553	2650	2748	2847	2946	3045	3145	3246	3347	3448	3549	53
1979 OCT 4.0		-1734	-1744	-1753	-1772	-1795	1777	1747	1715	1681	1646	1611	1577	1545	1517	1495	1484	1489	1522	1598	1722	1779
JD 2444140.5		1739	1837	1931	2027	2122	2217	2313	2409	2505	2602	2700	2798	2896	2995	3095	3195	3295	3396	3497	3589	102
1979 SEP 24.0		-1792	-1797	1790	1773	1752	1727	1699	1669	1637	1604	1572	1541	1512	1488	1473	1470	1490	1544	1647	1783	1760
JD 2444130.5		1786	1886	1981	2077	2172	2268	2363	2459	2556	2653	2750	2848	2946	3045	3145	3245	3345	3446	3547	51	152
1979 SEP 14.0		1749	1746	1736	1720	1701	1678	1652	1624	1594	1564	1534	1506	1482	1463	1455	1464	1500	1580	1714	1780	1740
JD 2444120.5		1842	1937	2032	2128	2223	2319	2414	2510	2607	2704	2801	2899	2997	3096	3196	3296	3396	3497	3592	101	203
1979 SEP 4.0		1699	1693	1683	1669	1651	1630	1606	1580	1553	1525	1498	1474	1454	1442	1443	1466	1524	1635	1786	1760	1719
JD 2444110.5		1893	1989	2084	2180	2275	2370	2466	2562	2659	2755	2853	2951	3049	3148	3248	3348	3448	3549	51	153	254
1979 AUG 25.0		1647	1642	1633	1620	1604	1584	1562	1538	1513	1488	1464	1444	1430	1425	1438	1479	1565	1710	1780	1739	1698
JD 2444100.5		1946	2042	2137	2232	2328	2423	2519	2615	2711	2808	2906	3003	3102	3201	3301	3401	3501	0	104	205	307
1979 AUG 15.0		1598	1594	1585	1573	1558	1540	1519	1498	1475	1453	1433	1417	1409	1414	1442	1506	1628	0	1758	1717	1676
JD 2444090.5		2000	2095	2191	2286	2381	2477	2573	2669	2765	2862	2959	3057	3156	3255	3354	3454	3555	56	157	259	361
1979 AUG 5.0		1552	1547	1539	1528	1514	1498	1479	1459	1439	1420	1404	1394	1394	1411	1458	1554	1713	1777	1736	1695	1654
JD 2444080.5		2054	2150	2245	2341	2436	2532	2627	2723	2820	2917	3014	3112	3210	3309	3409	3509	0	111	212	314	416
1979 JUL 26.0		1508	1503	1495	1485	1472	1457	1440	1423	1406	1391	1379	1376	1386	1419	1492	1626	0	1755	1713	1672	1630
	(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)

JD2444400.5	JD2444440.5	JD2444480.5	JD2444520.5	JD2444560.5
1980 JUN 10.0	1980 JUL 20.0	1980 AUG 29.0	1980 OCT 8.0	1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

M15
E11

	(FLT T) (200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2444200.5	294	393	621	1554	2539	734	433	313	250	213	190	176	169	167	170	179	195	221	266	347	524
1979 NOV 23.0	267	265	264	263	265	267	270	274	280	289	300	314	332	354	383	420	468	531	614	720	846
JD 2444190.5	320	457	838	4893	1116	525	349	267	221	193	175	165	161	161	166	177	197	229	284	392	663
1979 NOV 13.0	251	250	250	250	253	256	260	266	274	284	297	313	333	359	391	433	488	559	653	771	901
JD 2444180.5	355	557	1369	2486	682	399	287	229	195	174	161	154	152	154	162	176	199	238	308	456	940
1979 NOV 3.0	239	238	238	241	243	248	253	260	269	281	295	314	336	365	402	449	511	593	699	827	950
JD 2444170.5	405	740	4328	1013	472	313	239	197	172	157	147	143	143	148	157	174	201	249	339	562	1766
1979 OCT 24.0	229	229	229	232	236	241	247	255	266	279	295	316	341	373	415	468	539	632	751	886	986
JD 2444160.5	485	1198	2196	595	348	250	200	170	152	140	134	132	134	141	152	172	205	263	386	768	0
1979 OCT 14.0	222	221	223	225	229	235	243	252	264	278	297	319	348	384	431	492	572	678	810	941	0
JD 2444150.5	635	4115	846	397	264	202	167	146	133	125	121	121	125	133	147	170	209	283	461	1361	1315
1979 OCT 4.0	216	215	217	220	225	231	239	250	263	279	299	324	356	397	450	520	612	733	873	982	999
JD 2444140.5	1027	1695	477	281	204	163	139	124	115	110	108	110	115	125	140	167	214	311	608	8691	614
1979 SEP 24.0	212	211	213	216	221	228	237	249	263	281	303	331	367	413	473	553	660	794	933	999	997
JD 2444130.5	4438	633	305	204	157	130	114	104	98	95	95	98	104	115	133	163	221	358	1034	1083	363
1979 SEP 14.0	208	208	209	213	219	226	236	249	265	284	309	340	380	433	502	594	716	862	980	999	993
JD 2444120.5	1101	339	204	148	119	102	91	85	81	80	82	85	93	104	124	159	231	451	8290	459	232
1979 SEP 4.0	206	205	207	211	217	226	236	250	268	289	317	352	397	457	537	644	782	928	999	997	987
JD 2444110.5	400	201	136	106	88	77	71	67	65	65	67	72	79	92	113	152	248	734	728	247	151
1979 AUG 25.0	204	204	206	210	217	226	238	253	272	296	326	366	417	486	579	704	855	980	999	993	980
JD 2444100.5	193	119	88	71	61	55	51	49	49	50	52	56	64	76	98	143	284	0	270	139	95
1979 AUG 15.0	203	203	205	210	217	227	240	256	277	304	338	383	442	522	631	774	927	0	997	987	972
JD 2444090.5	93	65	50	42	37	34	33	32	32	33	35	39	45	56	76	126	404	325	117	73	54
1979 AUG 5.0	202	202	205	210	218	229	243	261	284	314	353	404	473	567	695	853	983	999	993	980	963
JD 2444080.5	33	25	20	18	16	15	14	14	15	15	17	19	23	29	44	90	0	74	39	27	22
1979 JUL 26.0	202	203	206	211	220	232	247	267	293	327	371	430	511	623	772	931	0	996	987	972	953

	(FLT T) (320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M15 E11

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

	(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2444200.5		1015	1012	1005	996	983	971	956	939	920	899	875	848	818	782	740	689	627	549	450	325	178
1979 NOV 23.0		-1752	-1740	-1725	-1708	-1693	-1675	-1660	-1647	-1636	-1628	-1623	1624	1629	1640	1659	1689	1732	1793	1878	1994	2138
JD 2444190.5		1015	1013	1008	1000	987	974	959	942	922	900	876	847	815	776	730	675	605	517	405	267	116
1979 NOV 13.0		-1696	-1688	-1678	-1665	-1655	-1644	-1633	-1624	-1618	-1614	1615	1619	1628	1645	1670	1706	1758	1831	1931	2064	2218
JD 2444180.5		-1014	1014	1009	1000	990	977	961	944	924	901	875	845	810	769	718	657	579	480	354	202	58
1979 NOV 3.0		-1652	-1647	-1641	-1634	-1626	-1618	-1612	-1607	-1604	1605	1609	1617	1631	1652	1683	1728	1790	1876	1994	2143	2295
JD 2444170.5		-1014	1015	1011	1002	992	979	963	945	925	901	873	842	804	759	704	635	548	435	293	135	16
1979 OCT 24.0		-1619	-1616	-1611	-1607	-1603	-1598	-1595	-1593	1595	1598	1606	1618	1636	1663	1701	1754	1828	1930	2065	2227	2361
JD 2444160.5		-1014	1015	1011	1004	994	981	965	946	925	900	871	837	796	747	686	609	509	382	225	70	0
1979 OCT 14.0		-1593	-1591	-1590	-1587	-1584	-1583	1583	1584	1588	1594	1605	1621	1645	1677	1723	1786	1873	1993	2147	2310	0
JD 2444150.5		-1014	1016	1012	1005	995	982	965	946	924	898	867	830	786	732	664	577	464	319	152	21	-0
1979 OCT 4.0		-1573	-1572	-1572	-1571	-1570	1572	1573	1577	1583	1593	1607	1628	1656	1695	1749	1824	1927	2067	2236	2382	2625
JD 2444140.5		-1014	1016	1013	1006	996	982	966	946	922	895	862	822	774	713	637	538	408	247	81	1	-4
1979 SEP 24.0		-1558	-1558	1559	1560	1561	1563	1567	1573	1582	1594	1612	1637	1671	1717	1781	1870	1992	2152	2326	2429	2651
JD 2444130.5		-1013	1016	1013	1006	996	982	965	944	920	890	855	812	758	691	604	490	342	167	24	-0	-9
1979 SEP 14.0		1548	1548	1549	1551	1553	1557	1563	1571	1582	1598	1620	1649	1690	1745	1821	1926	2069	2247	2404	2650	2675
JD 2444120.5		-1013	1016	1013	1006	996	982	964	942	916	884	846	799	739	663	563	432	264	88	1	-3	-16
1979 SEP 4.0		1540	1541	1542	1545	1548	1553	1561	1571	1585	1604	1630	1665	1713	1778	1868	1993	2159	2344	2454	2675	2698
JD 2444110.5		-1013	1016	1013	1006	995	981	962	939	911	877	835	783	716	629	513	361	177	25	-0	-9	-26
1979 AUG 25.0		1535	1536	1537	1541	1545	1552	1561	1574	1591	1613	1644	1685	1741	1818	1926	2074	2261	2429	2675	2700	2719
JD 2444100.5		-1014	1016	1013	1005	994	979	959	935	905	868	821	763	687	586	451	277	90	0	-4	-16	-37
1979 AUG 15.0		1531	1532	1535	1539	1545	1553	1564	1579	1598	1625	1661	1709	1775	1868	1997	2171	2366	0	2700	2722	2739
JD 2444090.5		-1014	1016	1012	1004	992	976	955	929	897	856	804	738	651	533	375	181	22	-0	-9	-26	-51
1979 AUG 5.0		1530	1531	1534	1539	1546	1555	1568	1586	1609	1640	1681	1739	1818	1929	2084	2281	2456	2699	2724	2743	2758
JD 2444080.5		-1014	1015	1011	1003	990	973	950	922	886	841	783	707	605	466	282	85	0	-4	-17	-38	-66
1979 JUL 26.0		1530	1531	1535	1540	1548	1560	1575	1595	1622	1658	1707	1775	1870	2005	2188	2395	0	2724	2746	2763	2775

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD2444400.5 1980 JUN 10.0																					
JD2444440.5 1980 JUL 20.0																					
JD2444480.5 1980 AUG 29.0																					
JD2444520.5 1980 OCT 8.0																					
JD2444560.5 1980 NOV 17.0																					

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E11

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2444200.5	130	139	148	157	167	177	187	197	207	218	230	241	254	267	282	298	318	344	382	450	604
1979 NOV 23.0	159	169	178	187	197	207	217	226	236	246	256	266	276	286	296	306	315	325	334	343	351
JD 2444190.5	135	144	153	161	172	181	191	202	212	223	234	246	259	272	287	305	327	356	404	496	748
1979 NOV 13.0	166	176	185	194	204	214	223	233	243	253	263	273	283	292	302	312	322	331	340	349	356
JD 2444180.5	140	149	158	167	176	186	196	206	217	228	239	251	264	278	293	312	336	372	433	568	1054
1979 NOV 3.0	173	183	192	202	211	221	230	240	250	260	269	279	289	299	309	319	328	337	346	354	361
JD 2444170.5	145	153	162	172	181	191	201	211	221	232	244	256	269	283	300	320	348	391	474	695	1998
1979 OCT 24.0	180	190	199	209	218	228	237	247	257	266	276	286	296	306	315	325	334	344	352	359	365
JD 2444160.5	150	158	167	176	186	195	205	215	226	237	248	261	274	289	307	330	362	418	540	960	0
1979 OCT 14.0	187	197	206	215	225	234	244	254	263	273	283	293	302	312	322	331	341	350	358	364	0
JD 2444150.5	154	163	172	181	191	200	210	220	231	242	253	266	280	296	315	341	381	457	655	1763	107
1979 OCT 4.0	194	203	213	222	232	241	251	260	270	280	290	299	309	319	328	338	347	355	363	368	213
JD 2444140.5	159	168	177	186	195	205	215	225	235	247	258	271	286	303	324	355	406	518	898	8115	108
1979 SEP 24.0	201	211	220	229	239	248	258	267	277	287	296	306	316	325	335	344	353	361	368	372	216
JD 2444130.5	164	173	182	191	200	210	219	230	240	252	264	277	292	311	335	372	443	627	1645	108	109
1979 SEP 14.0	208	217	227	236	246	255	265	274	284	293	303	313	322	332	341	350	359	366	372	216	220
JD 2444120.5	169	178	186	196	205	214	224	235	245	257	269	283	299	320	348	397	502	863	9999	109	111
1979 SEP 4.0	215	224	234	243	252	262	271	281	291	300	310	320	329	339	348	357	365	371	376	220	223
JD 2444110.5	174	182	191	200	210	219	229	240	251	262	275	290	307	330	366	433	610	1630	110	111	112
1979 AUG 25.0	222	231	241	250	259	269	278	288	298	307	317	326	336	345	354	363	370	376	220	223	227
JD 2444100.5	179	187	196	205	215	224	234	245	256	268	281	297	316	344	390	492	854	0	111	112	113
1979 AUG 15.0	229	238	248	257	266	276	285	295	304	314	324	333	342	352	360	368	375	0	223	226	230
JD 2444090.5	184	192	201	210	220	229	240	250	261	274	288	305	327	361	427	605	1744	111	112	113	115
1979 AUG 5.0	236	245	255	264	273	283	292	302	311	321	330	340	349	358	367	374	379	223	227	230	234
JD 2444080.5	189	197	206	215	225	235	245	256	267	280	295	314	341	386	489	877	0	112	113	114	116
1979 JUL 26.0	243	252	262	271	280	290	299	309	318	328	337	347	356	364	372	379	0	227	230	234	237

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M15 E11

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2444200.5 1979 NOV 23.0	1187	1200	1237	1467	1524	1303	1284	1298	1321	1350	1384	1426	1475	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444190.5 1979 NOV 13.0	1182	1198	1265	1524	1352	1262	1266	1285	1311	1343	1380	1425	1480	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444180.5 1979 NOV 3.0	1180	1205	1386	1524	1257	1240	1254	1276	1304	1338	1379	1428	1488	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444170.5 1979 OCT 24.0	1182	1229	1524	1300	1222	1226	1244	1269	1299	1336	1380	1433	1500	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444160.5 1979 OCT 14.0	1188	1326	1524	1218	1205	1217	1238	1264	1297	1336	1383	1442	1516	1524	1524	1524	1524	1524	1524	1524	0
JD 2444150.5 1979 OCT 4.0	1207	1524	1247	1191	1195	1211	1233	1262	1296	1338	1390	1454	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444140.5 1979 SEP 24.0	1281	1470	1187	1179	1189	1207	1231	1261	1298	1343	1399	1471	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444130.5 1979 SEP 14.0	1524	1202	1169	1172	1185	1205	1230	1262	1301	1350	1412	1493	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444120.5 1979 SEP 4.0	1297	1166	1161	1169	1184	1204	1231	1265	1307	1361	1430	1520	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444110.5 1979 AUG 25.0	1173	1156	1158	1167	1183	1205	1233	1270	1316	1375	1452	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444100.5 1979 AUG 15.0	1157	1153	1157	1167	1184	1207	1238	1277	1327	1393	1480	1524	1524	1524	1524	1524	1524	0	1524	1524	1524
JD 2444090.5 1979 AUG 5.0	1153	1151	1157	1168	1186	1211	1244	1287	1343	1417	1516	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444080.5 1979 JUL 26.0	1152	1151	1157	1170	1189	1216	1252	1300	1362	1446	1524	1524	1524	1524	1524	1524	0	1524	1524	1524	1524

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E11

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2444200.5	0	0	0	0	306	0	0	0	0	0	0	0	0	13	91	192	328	514	776	1154	1691
1979 NOV 23.0	445	436	438	580	875	416	355	321	295	274	257	248	249	265	301	364	462	607	816	1112	1524
JD 2444190.5	0	0	0	1305	0	0	0	0	0	0	0	0	0	25	112	228	384	601	912	1360	1987
1979 NOV 13.0	395	392	420	1561	475	356	317	291	271	255	244	241	251	276	324	402	519	690	935	1203	1758
JD 2444180.5	0	0	0	260	0	0	0	0	0	0	0	0	0	41	140	272	453	709	1079	1611	2327
1979 NOV 3.0	352	359	483	842	367	314	287	267	252	240	236	240	257	293	354	448	587	789	1078	1486	2026
JD 2444170.5	0	0	1039	0	0	0	0	0	0	0	0	0	0	62	174	326	539	842	1284	1911	2703
1979 OCT 24.0	318	345	1365	421	313	282	263	248	237	231	232	244	270	317	391	504	669	908	1251	1728	2323
JD 2444160.5	0	0	132	0	0	0	0	0	0	0	0	0	0	89	217	394	644	1008	1537	2263	0
1979 OCT 14.0	293	400	743	321	277	257	243	233	227	226	234	253	289	347	438	572	768	1052	1460	2010	0
JD 2444150.5	0	936	0	0	0	0	0	0	0	0	0	0	14	123	271	478	777	1214	1845	2659	3031
1979 OCT 4.0	283	1289	360	274	251	238	229	223	222	226	240	267	313	386	495	655	889	1229	1712	2329	2663
JD 2444140.5	0	0	0	0	0	0	0	0	0	0	0	0	40	165	338	583	943	1472	2213	3077	2946
1979 SEP 24.0	329	581	277	246	233	225	219	217	220	231	251	288	345	433	564	755	1037	1447	2012	2670	2627
JD 2444130.5	1078	0	0	0	0	0	0	0	0	0	0	0	75	219	422	716	1153	1793	2633	3034	2859
1979 SEP 14.0	1403	298	242	227	220	215	214	216	224	240	268	314	385	491	648	879	1220	1714	2357	2721	2591
JD 2444120.5	0	0	0	0	0	0	0	0	0	0	0	0	118	286	528	886	1421	2182	3083	2947	2772
1979 SEP 4.0	405	241	222	215	211	210	212	218	231	254	291	348	434	562	751	1033	1450	2037	2730	2686	2555
JD 2444110.5	0	0	0	0	0	0	0	0	0	0	0	31	172	372	664	1104	1760	2634	3029	2859	2684
1979 AUG 25.0	247	219	211	208	207	209	214	225	243	273	320	390	494	649	880	1227	1737	2414	2782	2651	2520
JD 2444100.5	0	0	0	0	0	0	0	0	0	0	0	75	241	481	841	1387	2178	0	2940	2769	2595
1979 AUG 15.0	217	208	206	205	207	212	221	236	261	299	356	441	568	758	1043	1473	2090	0	2748	2616	2484
JD 2444090.5	0	0	0	0	0	0	0	0	0	0	0	131	329	623	1072	1752	2669	3016	2849	2678	2504
1979 AUG 5.0	208	205	205	206	211	219	232	252	283	330	401	505	661	895	1251	1786	2505	2844	2713	2581	2449
JD 2444080.5	0	0	0	0	0	0	0	0	0	0	38	203	444	810	1377	2209	0	2924	2757	2586	2413
1979 JUL 26.0	207	206	207	211	218	229	247	273	312	370	456	584	776	1070	1520	2177	0	2809	2678	2545	2413

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M15
E11

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
JD 2444200.5	445	436	438	580	1180	416	355	321	295	274	257	248	249	278	392	556	790	1121	1592	2266	3215
1979 NOV 23.0	1453	1549	1644	1738	1839	1932	2027	2123	2219	2316	2413	2511	2610	2709	2808	2908	3009	3110	3211	3312	3414
JD 2444190.5	395	392	420	2866	475	356	317	291	271	255	244	241	251	301	436	629	903	1291	1847	2643	3745
1979 NOV 13.0	1499	1595	1690	1779	1883	1978	2073	2169	2265	2362	2460	2557	2656	2755	2854	2954	3055	3156	3257	3359	3460
JD 2444180.5	352	359	483	1102	367	314	287	267	252	240	236	240	257	334	494	720	1040	1498	2157	3097	4353
1979 NOV 3.0	1546	1641	1736	1836	1929	2024	2120	2216	2312	2409	2506	2604	2703	2802	2901	3001	3102	3203	3304	3405	3507
JD 2444170.5	318	345	2404	421	313	282	263	248	237	231	232	244	270	379	566	831	1208	1750	2535	3639	5025
1979 OCT 24.0	1593	1689	1779	1881	1976	2071	2167	2263	2359	2456	2554	2651	2750	2849	2948	3048	3149	3250	3351	3453	3553
JD 2444160.5	293	400	874	321	277	257	243	233	227	226	234	253	289	436	655	966	1412	2060	2997	4273	0
1979 OCT 14.0	1641	1736	1835	1929	2024	2119	2215	2311	2407	2504	2602	2699	2798	2897	2996	3096	3197	3298	3399	3500	0
JD 2444150.5	283	2225	360	274	251	238	229	223	222	226	240	267	327	509	766	1133	1665	2444	3557	4987	5693
1979 OCT 4.0	1690	1782	1882	1977	2073	2168	2264	2360	2456	2553	2650	2748	2847	2946	3045	3145	3246	3347	3448	3549	53
JD 2444140.5	329	581	277	246	233	225	219	217	220	231	251	288	386	599	901	1339	1979	2919	4225	5747	5572
1979 SEP 24.0	1739	1837	1931	2027	2122	2217	2313	2409	2505	2602	2700	2798	2896	2995	3095	3195	3295	3396	3497	3589	102
JD 2444130.5	2481	298	242	227	220	215	214	216	224	240	268	314	460	710	1070	1595	2374	3507	4991	5755	5450
1979 SEP 14.0	1786	1886	1981	2077	2172	2268	2363	2459	2556	2653	2750	2848	2946	3045	3145	3245	3345	3446	3547	51	152
JD 2444120.5	405	241	222	215	211	210	212	218	231	254	291	348	552	848	1280	1919	2871	4219	5813	5633	5328
1979 SEP 4.0	1842	1937	2032	2128	2223	2319	2414	2510	2607	2704	2801	2899	2997	3096	3196	3296	3396	3497	3592	101	203
JD 2444110.5	247	219	211	208	207	209	214	225	243	273	320	420	666	1021	1545	2331	3496	5048	5811	5510	5204
1979 AUG 25.0	1893	1989	2084	2180	2275	2370	2466	2562	2659	2755	2853	2951	3049	3148	3248	3348	3448	3549	51	153	254
JD 2444100.5	217	208	206	205	207	212	221	236	261	299	356	516	809	1239	1884	2860	4268	0	5687	5385	5079
1979 AUG 15.0	1946	2042	2137	2232	2328	2423	2519	2615	2711	2808	2906	3003	3102	3201	3301	3401	3501	0	104	205	307
JD 2444090.5	208	205	205	206	211	219	232	252	283	330	401	636	989	1518	2323	3538	5174	5860	5562	5259	4953
1979 AUG 5.0	2000	2095	2191	2286	2381	2477	2573	2669	2765	2862	2959	3057	3156	3255	3354	3454	3555	56	157	259	361
JD 2444080.5	207	206	207	211	218	229	247	273	312	370	494	787	1220	1880	2897	4386	0	5734	5435	5132	4826
1979 JUL 26.0	2054	2150	2245	2341	2436	2532	2627	2723	2820	2917	3014	3112	3210	3309	3409	3509	0	111	212	314	416

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)

JD2444400.5	JD2444440.5	JD2444480.5	JD2444520.5	JD2444560.5
1980 JUN 10.0	1980 JUL 20.0	1980 AUG 29.0	1980 OCT 8.0	1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

M16
E06

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2443860.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671801	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.579	DEGREES
MEAN ANOM. AT EPOCH	=	343.680	DEGREES
DATE OF NODAL PASSAGE	=	2443774.884	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10936L304

EPOCH = 2443860.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338600	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.395	DEGREES
ARG. OF PERIHELION	=	286.277	DEGREES
MEAN ANOM. AT EPOCH	=	312.549	DEGREES
DATE OF NODAL PASSAGE	=	2443385.556	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.057	DEGREES

EARTH - MARS TRAJECTORY PARAMETERS

M16
E06

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(920)	(910)	(900)	(890)	(880)	(870)	(860)	(850)	(840)	(830)	(820)	(810)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)
JD 2444320.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444310.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444300.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	737
1980 MAR 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	548
JD 2444290.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	840	669
1980 FEB 21.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	613	513
JD 2444280.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	959	760	609
1980 FEB 11.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	689	570	484
JD 2444270.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1096	865	688	554
1980 FEB 1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	777	637	533	459
JD 2444260.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1249	987	781	624	505
1980 JAN 22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	878	716	592	502	438
JD 2444250.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1411	1127	888	705	567	461
1980 JAN 12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	985	807	661	553	475	420
JD 2444240.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1281	1013	799	637	515	421
1980 JAN 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	910	743	613	519	453	405
JD 2444230.5	0	0	0	0	0	0	0	0	0	0	0	0	0	1534	1444	1155	908	719	577	468	383
1979 DEC 23.0	0	0	0	0	0	0	0	0	0	0	0	0	0	1091	1019	837	685	572	491	433	392
JD 2444220.5	0	0	0	0	0	0	0	0	0	0	0	0	1503	0	1310	1034	814	647	522	425	349
1979 DEC 13.0	0	0	0	0	0	0	0	0	0	0	0	0	1078	0	942	769	634	536	466	417	381
JD 2444210.5	0	0	0	0	0	0	0	0	0	0	0	1472	1528	1473	1178	924	729	583	472	386	318
1979 DEC 3.0	0	0	0	0	0	0	0	0	0	0	0	1066	1101	1053	866	707	589	505	445	402	372
JD 2444200.5	0	0	0	0	0	0	0	0	0	0	1440	1497	1553	1335	1051	823	652	524	427	350	289
1979 NOV 23.0	0	0	0	0	0	0	0	0	0	0	1053	1089	1124	973	794	652	551	478	427	390	364

(FLT T)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E06

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(920)	(910)	(900)	(890)	(880)	(870)	(860)	(850)	(840)	(830)	(820)	(810)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)
JD 2444320.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444310.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444300.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30
1980 MAR 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	172
JD 2444290.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	15
1980 FEB 21.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	126	142
JD 2444280.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-4	-3	0
1980 FEB 11.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	83	94	113
JD 2444270.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-19	-21	-19	-14
1980 FEB 1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43	48	63	85
JD 2444260.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-33	-38	-38	-34	-29
1980 JAN 22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	4	14	34	57
JD 2444250.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-44	-53	-56	-53	-48	-44
1980 JAN 12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3573	3564	3567	3583	5	29
JD 2444240.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-66	-72	-72	-68	-63	-60
1980 JAN 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3527	3523	3532	3552	3576	0
JD 2444230.5	0	0	0	0	0	0	0	0	0	0	0	0	0	238	-77	-87	-90	-88	-83	-78	-76
1979 DEC 23.0	0	0	0	0	0	0	0	0	0	0	0	0	0	820	3494	3482	3484	3499	3522	3547	3570
JD 2444220.5	0	0	0	0	0	0	0	0	0	0	0	0	231	0	-99	-106	-107	-103	-97	-93	-93
1979 DEC 13.0	0	0	0	0	0	0	0	0	0	0	0	0	726	0	3446	3439	3448	3467	3492	3517	3537
JD 2444210.5	0	0	0	0	0	0	0	0	0	0	0	218	229	-110	-120	-124	-122	-117	-112	-109	-111
1979 DEC 3.0	0	0	0	0	0	0	0	0	0	0	0	632	713	3412	3398	3398	3412	3435	3461	3485	3502
JD 2444200.5	0	0	0	0	0	0	0	0	0	0	200	215	227	-131	-138	-140	-136	-131	-126	-125	-131
1979 NOV 23.0	0	0	0	0	0	0	0	0	0	0	541	620	700	3361	3352	3359	3378	3403	3429	3451	3464

(FLT T)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E06

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	(920)	(910)	(900)	(890)	(880)	(870)	(860)	(850)	(840)	(830)	(820)	(810)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)
JD 2444320.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444310.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444300.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	219
1980 MAR 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	885
JD 2444290.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	216	217
1980 FEB 21.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	868	818
JD 2444280.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	213	212	212
1980 FEB 11.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	856	797	754
JD 2444270.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	212	208	206	205
1980 FEB 1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	850	781	730	693
JD 2444260.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	212	206	201	197	196
1980 JAN 22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	850	769	710	666	634
JD 2444250.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	213	205	197	191	187	185
1980 JAN 12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	856	764	694	643	605	578
JD 2444240.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	206	195	185	178	174	172
1980 JAN 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	765	683	622	579	547	524
JD 2444230.5	0	0	0	0	0	0	0	0	0	0	0	0	0	241	209	195	181	171	164	160	158
1979 DEC 23.0	0	0	0	0	0	0	0	0	0	0	0	0	0	790	771	678	607	556	519	492	471
JD 2444220.5	0	0	0	0	0	0	0	0	0	0	0	0	235	0	197	179	165	155	149	145	143
1979 DEC 13.0	0	0	0	0	0	0	0	0	0	0	0	0	727	0	679	596	535	492	461	438	421
JD 2444210.5	0	0	0	0	0	0	0	0	0	0	0	227	230	200	180	161	147	138	132	128	127
1979 DEC 3.0	0	0	0	0	0	0	0	0	0	0	0	665	688	684	591	519	468	433	406	387	372
JD 2444200.5	0	0	0	0	0	0	0	0	0	0	215	220	224	183	160	141	128	119	114	111	111
1979 NOV 23.0	0	0	0	0	0	0	0	0	0	0	603	625	649	591	508	448	406	376	353	337	324

(FLT T)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)

JD2443400.5	JD2443440.5	JD2443480.5	JD2443520.5	JD2443560.5
1977 SEP 14.0	1977 OCT 24.0	1977 DEC 3.0	1978 JAN 12.0	1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E06

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

	(FLT T) (920)	(910)	(900)	(890)	(880)	(870)	(860)	(850)	(840)	(830)	(820)	(810)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)
JD 2444320.5 1980 MAR 22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444310.5 1980 MAR 12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444300.5 1980 MAR 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	680
JD 2444290.5 1980 FEB 21.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	680	680
JD 2444280.5 1980 FEB 11.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	703	703	703
JD 2444270.5 1980 FEB 1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	746	746	746	746
JD 2444260.5 1980 JAN 22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	806	806	806	806	806
JD 2444250.5 1980 JAN 12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	878	878	878	878	878	878
JD 2444240.5 1980 JAN 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	958	958	958	958	958	958
JD 2444230.5 1979 DEC 23.0	0	0	0	0	0	0	0	0	0	0	0	0	0	1044	1044	1044	1044	1044	1044	1044	1044
JD 2444220.5 1979 DEC 13.0	0	0	0	0	0	0	0	0	0	0	0	0	1133	0	1133	1133	1133	1133	1133	1133	1133
JD 2444210.5 1979 DEC 3.0	0	0	0	0	0	0	0	0	0	0	0	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222
JD 2444200.5 1979 NOV 23.0	0	0	0	0	0	0	0	0	0	0	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311
(FLT T)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

M16
E06

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(920)	(910)	(900)	(890)	(880)	(870)	(860)	(850)	(840)	(830)	(820)	(810)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)
JD 2444320.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444310.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444300.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54
1960 MAR 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1709
JD 2444290.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44	44
1980 FEB 21.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1726	1726
JD 2444280.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	117	117	117
1980 FEB 11.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1599	1599	1599
JD 2444270.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	187	187	187	187
1980 FEB 1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1473	1473	1473	1473
JD 2444260.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	244	244	244	244	244
1980 JAN 22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1359	1359	1359	1359	1359
JD 2444250.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	289	289	289	289	289	289
1980 JAN 12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1256	1256	1256	1256	1256	1256
JD 2444240.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	322	322	322	322	322	322
1980 JAN 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1166	1166	1166	1166	1166	1166
JD 2444230.5	0	0	0	0	0	0	0	0	0	0	0	0	0	345	345	345	345	345	345	345	345
1979 DEC 23.0	0	0	0	0	0	0	0	0	0	0	0	0	0	1085	1085	1085	1085	1085	1085	1085	1085
JD 2444220.5	0	0	0	0	0	0	0	0	0	0	0	0	361	0	361	361	361	361	361	361	361
1979 DEC 13.0	0	0	0	0	0	0	0	0	0	0	0	0	1012	0	1012	1012	1012	1012	1012	1012	1012
JD 2444210.5	0	0	0	0	0	0	0	0	0	0	0	370	370	370	370	370	370	370	370	370	370
1979 DEC 3.0	0	0	0	0	0	0	0	0	0	0	0	947	947	947	947	947	947	947	947	947	947
JD 2444200.5	0	0	0	0	0	0	0	0	0	0	375	375	375	375	375	375	375	375	375	375	375
1979 NOV 23.0	0	0	0	0	0	0	0	0	0	0	887	887	887	887	887	887	887	887	887	887	887

(FLT T)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E06

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(920)	(910)	(900)	(890)	(880)	(870)	(860)	(850)	(840)	(830)	(820)	(810)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)
JD 2444320.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444310.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444300.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3263
1980 MAR 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1004
JD 2444290.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3318	3220
1980 FEB 21.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1108	-933
JD 2444280.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3374	3275	3176
1980 FEB 11.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1223	-1030	-866
JD 2444270.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3430	3330	3231	3132
1980 FEB 1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1350	-1136	-957	-803
JD 2444260.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3486	3386	3287	3187	3088
1980 JAN 22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1488	-1252	-1054	-888	-743
JD 2444250.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3542	3442	3342	3243	3143	3044
1980 JAN 12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1636	-1380	-1161	-979	-823	-684
JD 2444240.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3499	3398	3298	3198	3099	3000
1980 JAN 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1520	-1278	-1077	-907	-760	-628
JD 2444230.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61	3553	3455	3354	3254	3154	3054	2956
1979 DEC 23.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1763	-1668	-1408	-1184	-998	-839	-700	-572
JD 2444220.5	0	0	0	0	0	0	0	0	0	0	0	0	0	117	0	3510	3410	3309	3209	3109	3010	2911
1979 DEC 13.0	0	0	0	0	0	0	0	0	0	0	0	0	0	1730	0	-1550	-1302	-1096	-923	-774	-641	-518
JD 2444210.5	0	0	0	0	0	0	0	0	0	0	0	173	72	3564	3466	3365	3264	3164	3064	2964	2865
1979 DEC 3.0	0	0	0	0	0	0	0	0	0	0	0	1696	1756	-1697	-1433	-1203	-1013	-853	-711	-583	-464
JD 2444200.5	0	0	0	0	0	0	0	0	0	0	229	128	30	3521	3420	3319	3218	3118	3018	2919	2820
1979 NOV 23.0	0	0	0	0	0	0	0	0	0	0	1662	1723	1782	-1576	-1322	-1111	-935	-785	-650	-526	-410

(FLT T)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)

JD2443400.5 1977 SEP 14.0

JD2443440.5 1977 OCT 24.0

JD2443480.5 1977 DEC 3.0

JD2443520.5 1978 JAN 12.0

JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

M16
E06

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL.TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(920)	(910)	(900)	(890)	(880)	(870)	(860)	(850)	(840)	(830)	(820)	(810)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)
JD 2444320.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444310.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444300.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	316
1980 MAR 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	681
JD 2444290.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	380	291
1980 FEB 21.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	741	639
JD 2444280.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	474	339	270
1980 FEB 11.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	807	693	601
JD 2444270.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	631	406	307	253
1980 FEB 1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	875	755	649	566
JD 2444260.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	941	508	356	280	237
1980 JAN 22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	937	822	705	609	535
JD 2444250.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1845	682	425	316	258	224
1980 JAN 12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	982	889	767	658	572	508
JD 2444240.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1047	533	365	284	239	212
1980 JAN 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	949	635	715	615	539	482
JD 2444230.5	0	0	0	0	0	0	0	0	0	0	0	0	0	1719	2285	723	435	319	258	222	201
1979 DEC 23.0	0	0	0	0	0	0	0	0	0	0	0	0	0	999	988	901	778	665	576	509	460
JD 2444220.5	0	0	0	0	0	0	0	0	0	0	0	0	879	0	1146	546	365	281	235	207	190
1979 DEC 13.0	0	0	0	0	0	0	0	0	0	0	0	0	997	0	958	846	723	620	541	482	439
JD 2444210.5	0	0	0	0	0	0	0	0	0	0	0	582	1386	2870	746	433	312	250	215	193	180
1979 DEC 3.0	0	0	0	0	0	0	0	0	0	0	0	993	999	993	912	787	671	579	509	458	421
JD 2444200.5	0	0	0	0	0	0	0	0	0	0	430	759	3429	1223	542	355	270	224	196	180	171
1979 NOV 23.0	0	0	0	0	0	0	0	0	0	0	988	996	1000	966	855	729	623	541	481	436	404

(FLT T)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E06

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(920)	(910)	(900)	(890)	(880)	(870)	(860)	(850)	(840)	(830)	(820)	(810)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)
JD 2444320.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444310.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444300.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	521
1980 MAR 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2745
JD 2444290.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	421	587
1980 FEB 21.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2831	2664
JD 2444280.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	312	496	646
1980 FEB 11.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2925	2739	2591
JD 2444270.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	201	395	565	698
1980 FEB 1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3024	2825	2654	2523
JD 2444260.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	101	286	473	627	745
1980 JAN 22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3115	2919	2730	2577	2462
JD 2444250.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	177	371	545	682	786
1980 JAN 12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3180	3016	2816	2642	2507	2406
JD 2444240.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	82	262	452	610	731	823
1980 JAN 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3102	2910	2717	2561	2442	2355
JD 2444230.5	0	0	0	0	0	0	0	0	0	0	0	0	0	-0	19	156	350	527	668	775	855
1979 DEC 23.0	0	0	0	0	0	0	0	0	0	0	0	0	0	3370	3159	3004	2804	2625	2487	2384	2309
JD 2444220.5	0	0	0	0	0	0	0	0	0	0	0	0	-4	0	66	242	434	596	720	814	883
1979 DEC 13.0	0	0	0	0	0	0	0	0	0	0	0	0	3366	0	3085	2897	2701	2540	2419	2330	2265
JD 2444210.5	0	0	0	0	0	0	0	0	0	0	0	-10	-1	11	138	332	513	657	766	848	907
1979 DEC 3.0	0	0	0	0	0	0	0	0	0	0	0	3360	3339	3134	2989	2787	2605	2463	2358	2281	2226
JD 2444200.5	0	0	0	0	0	0	0	0	0	0	-19	-5	0	53	226	421	585	712	807	877	929
1979 NOV 23.0	0	0	0	0	0	0	0	0	0	0	3353	3334	3310	3065	2879	2680	2516	2392	2302	2236	2189

(FLT T)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E06

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(920)	(910)	(900)	(890)	(880)	(870)	(860)	(850)	(840)	(830)	(820)	(810)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)
JD 2444320.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444310.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444300.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	354
1980 MAR 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	420
JD 2444290.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	393	333
1980 FEB 21.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	423	415
JD 2444280.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	456	362	317
1980 FEB 11.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	425	418	410
JD 2444270.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	567	406	340	304
1980 FEB 1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	428	421	413	405
JD 2444260.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	801	476	371	322	293
1980 JAN 22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	429	424	417	409	400
JD 2444250.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1509	604	419	346	308	284
1980 JAN 12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	431	426	420	412	404	395
JD 2444240.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	889	497	380	327	296	276
1980 JAN 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	428	422	415	407	399	390
JD 2444230.5	0	0	0	0	0	0	0	0	0	0	0	0	0	116	1874	644	432	352	312	287	268
1979 DEC 23.0	0	0	0	0	0	0	0	0	0	0	0	0	0	271	429	424	418	411	402	394	385
JD 2444220.5	0	0	0	0	0	0	0	0	0	0	0	0	116	0	991	518	388	331	299	278	262
1979 DEC 13.0	0	0	0	0	0	0	0	0	0	0	0	0	272	0	426	421	414	406	397	389	380
JD 2444210.5	0	0	0	0	0	0	0	0	0	0	0	116	116	2399	684	443	358	315	289	271	256
1979 DEC 3.0	0	0	0	0	0	0	0	0	0	0	0	272	270	427	423	417	409	401	392	384	375
JD 2444200.5	0	0	0	0	0	0	0	0	0	0	117	116	116	1103	536	395	335	302	280	264	251
1979 NOV 23.0	0	0	0	0	0	0	0	0	0	0	273	270	268	425	419	412	404	396	387	378	369

(FLT T)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E06

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(920)	(910)	(900)	(890)	(880)	(870)	(860)	(850)	(840)	(830)	(820)	(810)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)
JD 2444320.5 1980 MAR 22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444310.5 1980 MAR 12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444300.5 1980 MAR 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	772
JD 2444290.5 1980 FEB 21.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	772	772
JD 2444280.5 1980 FEB 11.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	772	772	772
JD 2444270.5 1980 FEB 1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	772	772	772	772
JD 2444260.5 1980 JAN 22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	772	772	772	772	772
JD 2444250.5 1980 JAN 12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	772	772	772	772	772	772
JD 2444240.5 1980 JAN 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	772	772	772	772	772	772
JD 2444230.5 1979 DEC 23.0	0	0	0	0	0	0	0	0	0	0	0	0	0	772	772	772	772	772	772	772	772
JD 2444220.5 1979 DEC 13.0	0	0	0	0	0	0	0	0	0	0	0	0	772	0	772	772	772	772	772	772	772
JD 2444210.5 1979 DEC 3.0	0	0	0	0	0	0	0	0	0	0	0	772	772	772	772	772	772	772	772	772	772
JD 2444200.5 1979 NOV 23.0	0	0	0	0	0	0	0	0	0	0	772	772	772	772	772	772	772	772	772	772	772

(FLT T)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E06

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(920)	(910)	(900)	(890)	(880)	(870)	(860)	(850)	(840)	(830)	(820)	(810)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)
JD 2444320.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444310.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444300.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1679
1980 MAR 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1374
JD 2444290.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1958	1500
1980 FEB 21.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1559	1274
JD 2444280.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2287	1741	1344
1980 FEB 11.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1780	1435	1190
JD 2444270.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2671	2027	1551	1208
1980 FEB 1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2038	1628	1330	1120
JD 2444260.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3105	2365	1797	1385	1088
1980 JAN 22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2332	1858	1498	1241	1060
JD 2444250.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3570	2758	2090	1595	1239	982
1980 JAN 12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2648	2125	1699	1387	1166	1010
JD 2444240.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3198	2436	1846	1418	1111	890
1980 JAN 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2426	1937	1560	1291	1101	967
JD 2444230.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3925	3664	2836	2145	1632	1263	999	808
1979 DEC 23.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2960	2748	2212	1768	1441	1210	1047	931
JD 2444220.5	0	0	0	0	0	0	0	0	0	0	0	0	0	3836	0	3281	2497	1886	1443	1127	900	736
1979 DEC 13.0	0	0	0	0	0	0	0	0	0	0	0	0	0	2922	0	2521	2013	1620	1338	1140	1000	901
JD 2444210.5	0	0	0	0	0	0	0	0	0	0	0	0	3745	3909	3748	2902	2188	1657	1278	1008	813	673
1979 DEC 3.0	0	0	0	0	0	0	0	0	0	0	0	0	2885	2989	2846	2297	1834	1492	1250	1081	961	876
JD 2444200.5	0	0	0	0	0	0	0	0	0	0	3653	3819	3981	3351	2544	1912	1457	1134	903	737	618
1979 NOV 23.0	0	0	0	0	0	0	0	0	0	0	2849	2954	3057	2612	2086	1675	1381	1174	1030	927	854

(FLT T)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

M16
E06

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(920)	(910)	(900)	(890)	(880)	(870)	(860)	(850)	(840)	(830)	(820)	(810)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)
JD 2444320.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444310.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444300.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3053
1980 MAR 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3263
JD 2444290.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3516	2775
1980 FEB 21.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3318	3220
JD 2444280.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4067	3176	2535
1980 FEB 11.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3374	3275	3176
JD 2444270.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4709	3655	2881	2328
1980 FEB 1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3430	3330	3231	3132
JD 2444260.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5436	4223	3295	2626	2148
1980 JAN 22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3486	3386	3287	3187	3088
JD 2444250.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6218	4883	3789	2982	2405	1992
1980 JAN 12.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3542	3442	3342	3243	3143	3044
JD 2444240.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5624	4373	3407	2709	2213	1857
1980 JAN 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3499	3398	3298	3198	3099	3000
JD 2444230.5	0	0	0	0	0	0	0	0	0	0	0	0	0	6885	6412	5049	3913	3073	2473	2046	1739
1979 DEC 23.0	0	0	0	0	0	0	0	0	0	0	0	0	0	61	3553	3455	3354	3254	3154	3054	2956
JD 2444220.5	0	0	0	0	0	0	0	0	0	0	0	0	6758	0	5802	4510	3506	2781	2267	1900	1637
1979 DEC 13.0	0	0	0	0	0	0	0	0	0	0	0	0	117	0	3510	3410	3309	3209	3109	3010	2911
JD 2444210.5	0	0	0	0	0	0	0	0	0	0	0	6630	6898	6594	5200	4022	3149	2528	2088	1774	1549
1979 DEC 3.0	0	0	0	0	0	0	0	0	0	0	0	173	72	3564	3466	3365	3264	3164	3064	2964	2865
JD 2444200.5	0	0	0	0	0	0	0	0	0	0	6501	6773	7039	5963	4629	3587	2837	2308	1933	1664	1472
1979 NOV 23.0	0	0	0	0	0	0	0	0	0	0	229	128	30	3521	3420	3319	3218	3118	3018	2919	2820

(FLT T)	(800)	(790)	(780)	(770)	(760)	(750)	(740)	(730)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)

JD2443400.5 1977 SEP 14.0 | JD2443440.5 1977 OCT 24.0 | JD2443480.5 1977 DEC 3.0 | JD2443520.5 1978 JAN 12.0 | JD2443560.5 1978 FEB 21.0

EARTH DEPARTURE OR ARRIVAL DATE

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2443960.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671790	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.583	DEGREES
MEAN ANOM. AT EPOCH	=	82.240	DEGREES
DATE OF NODAL PASSAGE	=	2444140.136	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2443960.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338626	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.397	DEGREES
ARG. OF PERIHELION	=	286.279	DEGREES
MEAN ANOM. AT EPOCH	=	4.951	DEGREES
DATE OF NODAL PASSAGE	=	2444072.533	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.058	DEGREES

M16
E07

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

	(FLT T)(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2444320.5	0	0	572	464	379	313	260	222	197	187	192	208	235	269	311	376	1078	473	488	534	585
1980 MAR 22.0	0	0	449	394	355	327	308	295	288	285	285	289	296	307	321	348	767	382	386	406	431
JD 2444310.5	0	648	523	426	350	290	243	210	191	186	196	217	246	284	332	448	634	467	503	551	605
1980 MAR 12.0	0	494	427	379	345	321	305	295	289	287	289	294	302	314	332	387	477	380	395	417	442
JD 2444300.5	737	591	479	392	323	269	227	200	186	187	202	226	259	300	363	826	477	476	519	570	624
1980 MAR 2.0	548	466	408	367	337	317	303	295	291	290	293	300	309	323	348	610	392	387	405	428	454
JD 2444290.5	669	540	440	361	298	250	214	192	184	191	209	237	273	321	425	770	459	489	536	589	644
1980 FEB 21.0	513	443	393	357	331	314	302	296	293	294	298	306	316	333	380	566	384	395	416	440	467
JD 2444280.5	609	493	403	332	276	233	202	186	184	196	218	249	289	349	679	487	464	504	554	608	665
1980 FEB 11.0	484	423	380	348	327	312	302	297	296	298	304	312	325	348	524	406	389	406	428	453	481
JD 2444270.5	554	451	370	306	256	218	193	182	186	202	228	263	309	403	981	452	476	521	573	628	686
1980 FEB 1.0	459	406	369	342	323	310	303	299	300	303	310	320	335	375	706	390	397	417	440	466	495
JD 2444260.5	505	413	340	282	237	204	186	181	190	210	240	279	336	586	502	453	491	539	592	649	707
1980 JAN 22.0	438	392	360	336	320	310	304	302	304	308	316	328	349	474	423	392	407	429	453	480	510
JD 2444250.5	461	378	312	260	220	194	180	182	196	220	253	298	383	1257	446	463	507	558	612	670	730
1980 JAN 12.0	420	381	352	332	319	310	306	306	308	314	323	338	372	893	396	400	419	441	467	495	525
JD 2444240.5	421	346	286	240	206	185	178	185	203	232	269	323	522	520	442	477	525	578	633	692	752
1980 JAN 2.0	405	371	346	329	318	311	309	310	314	321	332	350	444	444	397	410	431	455	481	510	541
JD 2444230.5	383	316	263	222	193	178	178	190	213	245	287	364	1503	439	451	494	544	598	655	714	776
1979 DEC 23.0	392	362	341	327	318	313	312	314	319	328	341	370	1060	403	404	422	444	469	496	526	558
JD 2444220.5	349	289	241	206	183	175	180	197	224	259	310	474	536	431	465	512	564	619	677	737	800
1979 DEC 13.0	381	356	338	326	319	316	316	319	326	336	353	426	463	401	414	434	458	484	512	543	576
JD 2444210.5	318	264	222	192	176	174	184	206	236	277	347	1269	431	440	482	531	584	641	699	761	825
1979 DEC 3.0	372	350	335	325	320	318	320	325	333	345	370	914	409	408	426	447	472	499	529	560	594
JD 2444200.5	289	241	205	181	171	175	191	217	251	299	437	541	420	454	500	551	606	663	723	785	850
1979 NOV 23.0	364	346	333	326	322	322	325	331	340	356	414	477	406	418	438	461	487	515	546	579	613

(FLT T)(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E07

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2444320.5	0	0	65	67	66	59	44	20	-14	-54	-89	-115	-132	-146	-172	-253	-760	259	161	142	145
1980 MAR 22.0	0	0	268	288	303	310	301	272	220	154	87	38	14	16	42	101	3482	3552	84	161	229
JD 2444310.5	0	48	51	52	49	39	20	-8	-47	-87	-120	-143	-159	-177	-220	-394	416	186	135	128	136
1980 MAR 12.0	0	220	240	259	273	275	260	223	166	97	36	3596	3582	3593	31	122	3216	3585	80	151	217
JD 2444300.5	30	33	36	36	31	18	-5	-39	-81	-120	-150	-170	-187	-214	-291	-718	267	142	116	116	127
1980 MAR 2.0	172	191	212	231	241	238	216	172	109	41	3586	3556	3552	3574	30	85	3438	3592	72	140	206
JD 2444290.5	15	18	21	19	11	-5	-34	-72	-115	-152	-178	-197	-217	-260	-414	417	176	111	99	105	119
1980 FEB 21.0	142	163	185	201	208	199	169	117	51	3586	3539	3519	3525	3560	48	3009	3489	3591	63	129	194
JD 2444280.5	0	4	5	1	-9	-31	-65	-107	-149	-182	-206	-225	-252	-326	-679	276	122	88	85	95	111
1980 FEB 11.0	113	136	156	170	172	156	118	59	3591	3531	3494	3485	3503	3555	81	3324	3503	3585	53	117	182
JD 2444270.5	-14	-11	-11	-17	-33	-60	-98	-142	-182	-211	-232	-254	-296	-435	387	166	85	69	73	86	104
1980 FEB 1.0	85	108	127	137	133	110	63	3599	3531	3479	3452	3454	3485	3568	2801	3395	3503	3576	42	106	170
JD 2444260.5	-29	-26	-29	-38	-58	-90	-132	-176	-212	-238	-259	-287	-356	-657	286	101	58	53	61	77	96
1980 JAN 22.0	57	80	96	102	91	59	4	3536	3472	3428	3413	3426	3475	15	3212	3414	3499	3567	31	94	158
JD 2444250.5	-44	-43	-48	-61	-86	-123	-168	-209	-241	-264	-286	-327	-454	327	155	58	37	39	51	68	89
1980 JAN 12.0	29	50	63	63	44	3	3540	3471	3413	3380	3377	3404	3481	2610	3303	3417	3491	3556	19	82	146
JD 2444240.5	-60	-61	-69	-87	-117	-158	-202	-240	-267	-289	-317	-383	-646	295	79	28	19	26	41	60	81
1980 JAN 2.0	0	19	27	21	3593	3541	3473	3405	3356	3335	3343	3388	3524	3106	3328	3413	3481	3545	7	70	134
JD 2444230.5	-76	-79	-91	-114	-150	-193	-235	-268	-292	-315	-354	-470	-638	141	30	4	3	15	32	52	74
1979 DEC 23.0	3570	3585	3588	3573	3535	3474	3402	3339	3301	3292	3315	3385	2099	3216	3332	3406	3470	3533	3595	58	122
JD 2444220.5	-93	-100	-116	-144	-184	-228	-266	-293	-315	-342	-404	-642	301	54	-3	-15	-9	4	23	44	67
1979 DEC 13.0	3537	3548	3544	3519	3470	3401	3329	3274	3248	3253	3292	3415	3009	3243	3328	3396	3459	3521	3583	46	109
JD 2444210.5	-111	-122	-143	-176	-218	-260	-292	-315	-337	-375	-483	-698	123	-0	-29	-31	-22	-5	14	36	60
1979 DEC 3.0	3502	3507	3495	3458	3398	3323	3255	3212	3198	3217	3279	1945	3133	3248	3320	3385	3447	3509	3571	33	97
JD 2444200.5	-131	-145	-172	-209	-251	-288	-314	-334	-361	-419	-639	300	25	-37	-50	-46	-33	-15	5	29	53
1979 NOV 23.0	3464	3461	3438	3389	3319	3242	3183	3152	3152	3186	3290	2927	3160	3243	3309	3372	3434	3496	3558	21	84

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E07

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

	(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2444320.5		0	0	229	235	241	248	254	261	269	277	285	295	307	324	354	429	640	69	172	206	222
1980 MAR 22.0		0	0	932	901	877	859	846	837	831	830	831	835	843	853	867	894	1561	922	928	946	965
JD 2444310.5		0	224	229	234	239	245	252	259	266	275	284	295	310	333	377	523	-144	127	187	212	225
1980 MAR 12.0		0	906	870	843	822	806	794	787	782	782	784	789	796	807	822	875	949	877	888	906	925
JD 2444300.5		219	223	226	231	236	241	248	255	263	272	282	295	314	344	416	702	30	155	196	215	227
1980 MAR 2.0		885	842	811	786	768	754	744	737	734	734	737	742	750	760	778	1199	844	835	848	866	886
JD 2444290.5		217	219	222	226	230	236	242	249	258	267	279	295	318	362	495	-208	101	171	201	217	227
1980 FEB 21.0		818	781	753	732	715	703	695	689	687	688	691	696	704	714	741	940	790	793	808	826	846
JD 2444280.5		212	213	215	219	223	229	235	243	252	262	276	295	326	394	678	-11	134	180	203	217	227
1980 FEB 11.0		754	722	697	678	664	654	647	642	641	642	645	651	657	666	845	773	745	753	768	786	807
JD 2444270.5		205	205	207	211	215	220	227	235	245	257	273	296	339	458	-239	71	151	184	203	216	225
1980 FEB 1.0		693	665	643	627	614	605	599	596	595	597	600	605	610	619	965	707	702	713	728	747	768
JD 2444260.5		196	196	198	201	205	211	218	227	237	251	269	299	363	617	-55	109	160	185	201	213	222
1980 JAN 22.0		634	610	591	577	566	558	553	551	551	552	556	559	561	618	709	657	660	673	689	708	729
JD 2444250.5		185	185	187	190	194	200	208	217	229	244	267	307	415	-218	40	127	163	184	198	209	218
1980 JAN 12.0		578	557	540	528	519	512	508	507	507	508	511	512	510	1001	627	613	620	633	650	669	690
JD 2444240.5		172	172	174	178	182	189	197	207	220	238	267	325	548	-97	82	136	163	181	194	204	212
1980 JAN 2.0		524	505	491	481	473	467	464	463	463	465	466	464	467	649	572	570	580	594	612	631	652
JD 2444230.5		158	159	161	164	170	176	185	196	211	232	270	366	630	10	101	138	160	176	188	198	206
1979 DEC 23.0		471	456	443	434	428	423	421	420	420	421	420	410	1128	549	526	529	541	556	573	593	614
JD 2444220.5		143	144	146	150	156	163	172	185	202	229	282	477	-134	54	109	137	155	169	181	191	200
1979 DEC 13.0		421	407	397	389	383	380	378	377	378	377	372	352	589	488	482	489	502	518	536	555	577
JD 2444210.5		127	128	131	135	141	149	159	173	193	228	314	693	-18	73	110	133	149	162	173	183	192
1979 DEC 3.0		372	360	351	344	340	337	336	335	335	333	319	823	469	439	441	450	464	480	498	518	539
JD 2444200.5		111	112	115	120	126	135	146	162	186	235	406	-164	27	80	108	126	141	153	164	174	183
1979 NOV 23.0		324	314	306	301	297	295	294	294	292	286	256	524	404	395	400	412	426	442	461	481	503

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E07

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2444320.5 1980 MAR 22.0	0	0	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742
JD 2444310.5 1980 MAR 12.0	0	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701
JD 2444300.5 1980 MAR 2.0	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680
JD 2444290.5 1980 FEB 21.0	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680
JD 2444280.5 1980 FEB 11.0	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703
JD 2444270.5 1980 FEB 1.0	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746
JD 2444260.5 1980 JAN 22.0	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
JD 2444250.5 1980 JAN 12.0	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878
JD 2444240.5 1980 JAN 2.0	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958
JD 2444230.5 1979 DEC 23.0	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044
JD 2444220.5 1979 DEC 13.0	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133
JD 2444210.5 1979 DEC 3.0	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222
JD 2444200.5 1979 NOV 23.0	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E07

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

	(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2444320.5		0	0	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
1980 MAR 22.0		0	0	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457
JD 2444310.5		0	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129
1980 MAR 12.0		0	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580
JD 2444300.5		54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54
1980 MAR 2.0		1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709
JD 2444290.5		44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
1980 FEB 21.0		1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726
JD 2444280.5		117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117
1980 FEB 11.0		1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599
JD 2444270.5		187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187
1980 FEB 1.0		1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473
JD 2444260.5		244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244
1980 JAN 22.0		1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359
JD 2444250.5		289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289
1980 JAN 12.0		1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256
JD 2444240.5		322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322
1980 JAN 2.0		1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166
JD 2444230.5		345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345
1979 DEC 23.0		1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085
JD 2444220.5		361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361
1979 DEC 13.0		1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012
JD 2444210.5		370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370
1979 DEC 3.0		947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947
JD 2444200.5		375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375
1979 NOV 23.0		887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887
	(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

M16
E07

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
(FLT T)	0		3155	3058	2961	2864	2769	2673	2577	2482	2387	2291	2196	2100	2005	1909	1819	1712	1615	1516	1417
JD 2444320.5	0	0	-817	-676	-548	-429	-318	-212	-112	-15	77	166	253	337	418	496	567	651	724	796	868
1980 MAR 22.0																					
JD 2444310.5	0	3209	3111	3014	2917	2821	2725	2629	2534	2438	2343	2248	2152	2057	1961	1866	1763	1668	1571	1473	1374
1980 MAR 12.0	0	-907	-757	-623	-499	-384	-276	-172	-73	21	113	201	287	369	450	527	609	681	754	826	897
JD 2444300.5	3263	3165	3067	2970	2873	2777	2681	2585	2490	2395	2299	2204	2109	2013	1918	1827	1721	1625	1527	1429	1330
1980 MAR 2.0	-1004	-842	-700	-571	-452	-340	-233	-132	-34	58	149	236	321	402	482	555	638	711	784	855	926
JD 2444290.5	3220	3121	3024	2926	2830	2733	2637	2542	2446	2351	2256	2160	2065	1970	1875	1770	1678	1581	1484	1385	1286
1980 FEB 21.0	-933	-781	-645	-521	-405	-296	-192	-92	3	96	185	271	355	436	513	597	669	742	814	885	955
JD 2444280.5	3176	3078	2980	2883	2786	2690	2594	2498	2403	2307	2212	2117	2022	1926	1834	1730	1635	1538	1440	1342	1243
1980 FEB 11.0	-866	-722	-593	-472	-360	-253	-150	-52	42	133	221	306	389	469	544	626	700	772	844	915	984
JD 2444270.5	3132	3034	2936	2839	2742	2646	2550	2454	2359	2264	2168	2073	1978	1883	1776	1687	1591	1494	1396	1298	1199
1980 FEB 1.0	-803	-666	-541	-424	-314	-209	-109	-12	81	171	258	342	423	502	589	658	731	803	875	945	1014
JD 2444260.5	3088	2990	2892	2795	2698	2602	2506	2411	2315	2220	2125	2029	1934	1842	1739	1644	1547	1450	1352	1254	1155
1980 JAN 22.0	-743	-612	-491	-377	-269	-166	-67	27	120	208	294	377	458	534	617	690	763	835	905	975	1044
JD 2444250.5	3044	2946	2848	2751	2654	2558	2462	2367	2271	2176	2081	1986	1891	1780	1696	1600	1503	1406	1308	1210	1111
1980 JAN 12.0	-684	-558	-441	-330	-224	-123	-25	68	159	247	331	413	493	583	649	723	795	866	936	1005	1074
JD 2444240.5	3000	2902	2804	2707	2610	2514	2418	2322	2227	2132	2036	1942	1848	1746	1652	1556	1459	1362	1264	1166	1067
1980 JAN 2.0	-628	-506	-391	-283	-179	-79	16	109	198	285	369	450	526	609	683	755	827	898	967	1036	1104
JD 2444230.5	2956	2857	2760	2662	2566	2469	2373	2278	2182	2087	1992	1898	1818	1703	1608	1512	1415	1317	1220	1121	1022
1979 DEC 23.0	-572	-454	-342	-236	-134	-35	58	150	236	324	406	486	550	643	716	789	860	930	999	1067	1134
JD 2444220.5	2911	2812	2715	2617	2521	2424	2328	2233	2137	2042	1947	1854	1752	1659	1563	1467	1370	1273	1175	1076	977
1979 DEC 13.0	-518	-403	-293	-189	-88	8	101	191	279	363	444	522	604	678	751	822	892	962	1030	1098	1165
JD 2444210.5	2865	2767	2669	2572	2475	2379	2283	2188	2092	1997	1902	1818	1708	1614	1518	1421	1325	1227	1130	1031	932
1979 DEC 3.0	-464	-351	-244	-141	-42	52	144	233	319	402	482	551	639	713	785	856	926	994	1062	1129	1195
JD 2444200.5	2820	2721	2624	2526	2430	2333	2237	2142	2047	1952	1858	1757	1663	1568	1472	1376	1279	1182	1084	985	886
1979 NOV 23.0	-410	-300	-195	-93	3	97	188	276	360	442	520	602	676	748	820	890	959	1027	1094	1160	1226
(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

M16
E07

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

	(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2444320.5		0	0	234	202	182	171	165	164	168	177	192	217	257	328	470	873	5728	1073	516	345	265
1980 MAR 22.0		0	0	583	519	472	438	414	399	389	385	386	391	399	411	425	443	462	489	515	544	576
JD 2444310.5		0	269	226	199	183	174	170	171	177	189	209	241	295	393	614	1498	2710	748	437	314	251
1980 MAR 12.0		0	628	552	496	455	425	405	392	385	382	385	391	400	413	429	448	472	496	523	554	586
JD 2444300.5		316	254	218	196	183	177	175	179	187	203	229	270	341	482	861	4126	1286	582	382	290	239
1980 MAR 2.0		681	592	525	475	440	414	397	386	381	380	384	391	402	416	433	452	478	503	532	564	597
JD 2444290.5		291	242	212	194	184	179	180	186	198	218	251	304	401	615	1387	3709	851	481	342	270	229
1980 FEB 21.0		639	560	501	457	426	404	389	381	377	378	384	392	404	420	438	462	485	512	542	574	609
JD 2444280.5		270	230	206	192	184	182	185	194	210	235	276	347	483	835	3209	1516	641	412	310	254	220
1980 FEB 11.0		601	531	479	441	413	394	383	376	375	377	384	394	407	424	442	467	492	520	551	585	621
JD 2444270.5		253	220	201	190	185	185	191	202	222	254	307	401	603	1279	5139	946	517	362	284	240	212
1980 FEB 1.0		566	504	459	426	402	386	377	372	372	377	385	396	411	428	452	474	500	530	562	597	634
JD 2444260.5		237	211	196	188	185	188	196	211	236	277	345	475	798	2629	1755	689	434	323	263	227	205
1980 JAN 22.0		535	481	441	412	392	379	372	369	371	377	386	399	414	432	457	481	509	540	573	609	647
JD 2444250.5		224	203	191	185	185	191	202	221	252	303	393	581	1175	7038	1026	541	374	291	244	216	198
1980 JAN 12.0		508	460	425	400	383	372	367	367	370	377	388	402	419	443	463	489	518	550	585	622	660
JD 2444240.5		212	195	187	183	186	194	208	232	271	335	458	752	2226	1985	720	444	328	265	228	205	191
1980 JAN 2.0		482	441	410	389	375	367	364	365	370	378	390	406	423	447	471	498	529	562	597	635	675
JD 2444230.5		201	188	182	181	186	197	215	244	293	377	551	1075	8905	1079	550	375	291	243	213	195	185
1979 DEC 23.0		460	423	397	379	368	362	361	364	370	380	394	410	425	454	479	508	539	574	610	649	690
JD 2444220.5		190	181	178	179	187	200	223	259	320	433	699	1924	2172	728	442	323	260	223	200	186	179
1979 DEC 13.0		439	408	386	371	362	358	359	363	371	383	397	415	438	461	488	518	551	586	624	664	705
JD 2444210.5		180	174	173	177	187	204	231	276	354	513	976	7197	1093	541	366	282	234	205	188	177	173
1979 DEC 3.0		421	394	375	363	357	355	357	363	373	386	402	418	445	470	498	529	563	600	639	679	721
JD 2444200.5		171	167	168	175	187	208	242	297	401	640	1684	2263	709	424	308	248	212	189	176	169	167
1979 NOV 23.0		404	381	366	357	352	353	357	364	376	390	407	429	453	479	509	541	577	614	654	696	738

	(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E07

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2444320.5	0	0	688	794	873	929	969	996	1011	1017	-1013	-1003	-986	-963	-934	-900	-863	-813	-763	-709	-651
1980 MAR 22.0	0	0	2610	2507	2432	2379	2341	2316	2300	2291	2289	2291	2298	2307	2320	2334	2347	2369	2387	2406	2425
JD 2444310.5	0	610	735	829	897	947	981	1002	1014	-1015	-1010	-998	-979	-953	-922	-886	-841	-795	-743	-688	-629
1980 MAR 12.0	0	2672	2550	2460	2395	2348	2316	2295	2282	2276	2275	2279	2287	2297	2310	2325	2345	2361	2379	2398	2417
JD 2444300.5	521	667	777	859	919	961	990	1008	1016	-1014	-1006	-991	-970	-942	-909	-873	-824	-776	-723	-666	-606
1980 MAR 2.0	2745	2602	2494	2416	2360	2320	2292	2275	2265	2261	2262	2267	2276	2288	2301	2314	2335	2353	2371	2389	2408
JD 2444290.5	587	716	814	885	937	974	998	1012	-1015	-1012	-1001	-984	-960	-930	-895	-851	-807	-756	-702	-643	-582
1980 FEB 21.0	2664	2538	2444	2376	2327	2293	2270	2256	2248	2246	2249	2256	2266	2278	2292	2311	2326	2344	2362	2381	2398
JD 2444280.5	646	760	846	908	954	985	1004	1014	-1015	-1008	-995	-975	-949	-917	-881	-835	-788	-736	-679	-620	-557
1980 FEB 11.0	2591	2479	2398	2339	2297	2268	2249	2237	2232	2232	2237	2244	2255	2268	2281	2301	2317	2335	2353	2371	2388
JD 2444270.5	698	799	874	929	967	994	1009	1015	-1013	-1003	-988	-965	-937	-903	-859	-817	-768	-714	-656	-596	-532
1980 FEB 1.0	2523	2427	2356	2305	2269	2244	2228	2220	2217	2219	2224	2233	2245	2258	2278	2291	2308	2326	2344	2361	2378
JD 2444260.5	745	833	899	946	979	1001	1012	-1014	-1009	-997	-979	-954	-924	-889	-844	-798	-747	-692	-633	-571	-507
1980 JAN 22.0	2462	2378	2317	2273	2242	2221	2209	2203	2202	2205	2212	2222	2234	2247	2266	2282	2299	2317	2334	2351	2367
JD 2444250.5	786	864	920	961	989	1006	1014	-1012	-1005	-990	-969	-943	-910	-865	-826	-778	-725	-668	-608	-545	-481
1980 JAN 12.0	2407	2333	2280	2243	2217	2200	2190	2187	2188	2192	2200	2211	2224	2245	2256	2272	2290	2307	2324	2341	2356
JD 2444240.5	823	890	939	974	997	1010	-1013	-1009	-999	-982	-959	-929	-895	-852	-807	-757	-702	-644	-582	-519	-454
1980 JAN 2.0	2355	2292	2247	2215	2193	2180	2173	2171	2174	2180	2189	2200	2213	2231	2246	2263	2280	2297	2314	2329	2344
JD 2444230.5	855	913	955	984	1003	1012	-1012	-1005	-992	-972	-946	-915	-885	-834	-786	-734	-678	-618	-556	-492	-427
1979 DEC 23.0	2309	2254	2215	2188	2171	2160	2156	2156	2160	2167	2177	2189	2196	2220	2236	2253	2270	2287	2303	2318	2331
JD 2444220.5	883	933	969	993	1007	-1011	-1009	-999	-983	-961	-933	-900	-857	-814	-765	-711	-653	-592	-529	-465	-400
1979 DEC 13.0	2265	2219	2186	2163	2149	2142	2139	2141	2147	2155	2166	2178	2196	2210	2226	2243	2260	2276	2291	2305	2317
JD 2444210.5	907	950	980	1000	1009	-1010	-1005	-992	-973	-949	-918	-887	-839	-793	-741	-686	-627	-565	-501	-437	-372
1979 DEC 3.0	2226	2186	2158	2140	2129	2124	2124	2127	2134	2144	2155	2163	2185	2200	2216	2233	2249	2265	2279	2292	2303
JD 2444200.5	929	965	990	1004	-1009	-1008	-999	-984	-962	-935	-903	-861	-819	-770	-717	-660	-600	-537	-473	-408	-344
1979 NOV 23.0	2189	2155	2132	2118	2110	2107	2109	2114	2122	2132	2144	2160	2174	2190	2206	2223	2238	2253	2267	2279	2289
(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E07

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2444320.5	0	0	307	282	265	251	240	230	221	212	204	197	190	183	176	170	164	158	152	147	142
1980 MAR 22.0	0	0	413	405	396	388	379	370	361	353	344	335	327	319	310	302	295	286	279	271	264
JD 2444310.5	0	327	295	275	259	246	236	226	217	209	201	194	186	180	173	167	161	155	150	144	139
1980 MAR 12.0	0	416	408	400	391	382	374	365	356	347	339	330	322	314	305	297	289	281	274	267	259
JD 2444300.5	354	312	286	268	254	242	231	222	213	205	198	190	183	177	170	165	158	153	147	142	137
1980 MAR 2.0	420	412	403	395	386	377	368	360	351	342	334	325	317	308	300	293	284	277	269	262	255
JD 2444290.5	333	300	278	261	248	237	227	218	210	202	194	187	180	174	168	161	155	150	145	140	135
1980 FEB 21.0	415	407	398	389	381	372	363	354	346	337	328	320	312	303	295	287	279	272	264	257	250
JD 2444280.5	317	289	270	256	243	233	223	215	206	199	191	184	177	171	165	159	153	147	142	137	133
1980 FEB 11.0	410	402	393	384	376	367	358	349	340	332	323	315	307	298	291	282	275	267	260	252	246
JD 2444270.5	304	281	264	250	239	229	220	211	203	195	188	181	174	168	161	156	150	145	140	135	130
1980 FEB 1.0	405	397	388	379	370	361	353	344	335	327	318	310	302	293	285	277	270	262	255	248	241
JD 2444260.5	293	273	258	245	235	225	216	207	200	192	185	178	172	165	159	153	148	142	137	133	128
1980 JAN 22.0	400	392	383	374	365	356	347	339	330	321	313	305	296	289	280	273	265	258	250	243	237
JD 2444250.5	284	266	252	241	230	221	212	204	196	189	182	175	169	162	156	151	145	140	135	130	126
1980 JAN 12.0	395	386	378	369	360	351	342	333	325	316	308	300	292	283	275	268	260	253	246	239	232
JD 2444240.5	276	260	247	236	226	217	209	201	193	186	179	172	166	159	154	148	143	138	133	128	124
1980 JAN 2.0	390	381	372	363	355	346	337	328	320	311	303	295	287	278	271	263	255	248	241	234	228
JD 2444230.5	268	254	242	232	222	213	205	197	190	183	176	169	164	157	151	146	140	135	131	126	122
1979 DEC 23.0	385	376	367	358	349	341	332	323	314	306	298	290	282	273	266	258	251	244	237	230	223
JD 2444220.5	262	249	238	228	218	210	202	194	187	180	173	167	160	154	149	143	138	133	128	124	120
1979 DEC 13.0	380	371	362	353	344	335	327	318	309	301	293	285	276	268	261	253	246	239	232	225	219
JD 2444210.5	256	244	233	224	215	206	198	191	184	177	170	164	157	152	146	141	136	131	126	122	118
1979 DEC 3.0	375	366	357	348	339	330	321	313	304	296	288	280	271	264	256	249	241	234	228	221	215
JD 2444200.5	251	239	229	220	211	203	195	187	180	174	167	161	155	149	143	138	133	129	124	120	116
1979 NOV 23.0	369	360	351	342	333	325	316	307	299	291	283	274	266	259	251	244	237	230	223	217	211

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M16 E07

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2444320.5 1980 MAR 22.0	0	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444310.5 1980 MAR 12.0	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444300.5 1980 MAR 2.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444290.5 1980 FEB 21.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444280.5 1980 FEB 11.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444270.5 1980 FEB 1.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444260.5 1980 JAN 22.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444250.5 1980 JAN 12.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444240.5 1980 JAN 2.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444230.5 1979 DEC 23.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444220.5 1979 DEC 13.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444210.5 1979 DEC 3.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444200.5 1979 NOV 23.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772

(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

M16
E07

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

	(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2444320.5		0	0	1251	988	799	663	567	504	467	454	460	484	525	583	661	791	2618	1010	1046	1156	1285
1980 MAR 22.0		0	0	1092	937	829	753	702	669	649	641	643	653	671	698	737	811	2008	903	915	972	1040
JD 2444310.5		0	1446	1130	902	737	619	538	486	458	453	466	496	543	609	702	951	1409	996	1081	1200	1334
1980 MAR 12.0		0	1220	1029	896	803	738	694	667	652	648	652	666	687	718	766	917	1170	900	940	1002	1072
JD 2444300.5		1679	1299	1025	826	683	582	513	471	453	454	474	511	565	639	764	1920	1020	1016	1120	1246	1384
1980 MAR 2.0		1374	1140	977	862	782	726	690	667	657	656	664	680	705	741	809	1551	930	917	968	1033	1107
JD 2444290.5		1500	1171	933	760	636	549	492	460	450	458	485	528	590	679	899	1769	978	1048	1162	1293	1436
1980 FEB 21.0		1274	1074	933	834	765	718	687	670	663	665	676	696	725	770	898	1426	910	941	999	1067	1143
JD 2444280.5		1344	1059	852	702	595	521	475	452	450	465	498	548	619	736	1528	1044	989	1085	1207	1343	1489
1980 FEB 11.0		1190	1018	897	812	752	712	687	674	671	677	691	714	748	810	1304	969	923	969	1032	1103	1181
JD 2444270.5		1208	960	780	650	559	498	462	447	452	475	514	572	656	850	2347	961	1017	1126	1254	1394	1544
1980 FEB 1.0		1120	972	867	793	743	709	689	680	680	689	707	733	775	884	1830	925	946	1001	1066	1140	1221
JD 2444260.5		1088	873	717	606	528	478	452	445	458	487	533	600	708	1288	1081	963	1052	1170	1303	1447	1601
1980 JAN 22.0		1060	933	842	779	736	708	692	687	691	703	724	756	812	1163	1019	932	974	1034	1103	1180	1263
JD 2444250.5		982	796	662	567	502	463	445	446	466	502	555	634	806	3127	947	987	1092	1217	1354	1502	1660
1980 JAN 12.0		1010	900	822	768	731	709	698	696	704	719	744	782	876	2377	943	954	1006	1070	1142	1221	1307
JD 2444240.5		890	729	614	533	480	451	441	450	477	519	582	682	1128	1124	938	1021	1136	1266	1407	1559	1721
1980 JAN 2.0		967	873	806	759	729	712	705	707	718	737	766	817	1078	1076	945	982	1040	1107	1182	1265	1353
JD 2444230.5		808	670	572	504	462	442	441	457	490	540	614	766	3837	931	959	1060	1182	1317	1463	1619	1784
1979 DEC 23.0		931	850	793	754	729	716	713	719	733	756	791	871	2869	962	965	1014	1076	1147	1225	1310	1402
JD 2444220.5		736	618	535	480	449	437	444	467	507	566	658	1014	1163	913	992	1104	1231	1370	1520	1680	1849
1979 DEC 13.0		901	831	783	750	731	723	723	733	750	777	823	1026	1131	958	993	1049	1115	1189	1270	1358	1453
JD 2444210.5		673	573	504	461	439	436	450	480	527	596	731	3163	912	933	1031	1150	1283	1426	1580	1744	1916
1979 DEC 3.0		876	816	775	749	735	731	735	748	769	802	871	2440	979	977	1025	1086	1156	1233	1318	1408	1506
JD 2444200.5		618	534	479	446	433	438	459	496	551	636	927	1175	889	966	1075	1200	1337	1485	1642	1810	1985
1979 NOV 23.0		854	804	770	750	740	740	748	764	790	831	992	1171	971	1005	1061	1126	1199	1280	1367	1461	1561
	(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2443600.5
1978 APR 2.0

JD2443640.5
1978 MAY 12.0

JD2443680.5
1978 JUN 21.0

JD2443720.5
1978 JUL 31.0

JD2443760.5
1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

M16
E07

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

	(FLT T)	(720)	(710)	(700)	(690)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)
JD 2444320.5		0	0	2343	1925	1627	1416	1269	1173	1117	1095	1103	1137	1196	1281	1398	1602	4626	1913	1961	2128	2325
1980 MAR 22.0		0	0	3155	3058	2961	2864	2769	2673	2577	2482	2387	2291	2196	2100	2005	1909	1819	1712	1615	1516	1417
JD 2444310.5		0	2666	2159	1798	1540	1357	1232	1153	1110	1100	1118	1162	1231	1327	1468	1869	2579	1896	2021	2202	2406
1980 MAR 12.0		0	3209	3111	3014	2917	2821	2725	2629	2534	2438	2343	2248	2152	2057	1961	1866	1763	1668	1571	1473	1374
JD 2444300.5		3053	2439	2002	1689	1465	1308	1202	1138	1109	1110	1138	1191	1270	1381	1573	3471	1951	1933	2089	2279	2490
1980 MAR 2.0		3263	3165	3067	2970	2873	2777	2681	2585	2490	2395	2299	2204	2109	2013	1918	1827	1721	1625	1527	1429	1330
JD 2444290.5		2775	2245	1866	1594	1401	1267	1179	1130	1112	1124	1161	1224	1314	1448	1797	3194	1887	1989	2161	2360	2578
1980 FEB 21.0		3220	3121	3024	2926	2830	2733	2637	2542	2446	2351	2256	2160	2065	1970	1875	1770	1678	1581	1484	1385	1286
JD 2444280.5		2535	2077	1749	1513	1347	1233	1162	1125	1120	1142	1189	1262	1367	1545	2832	2014	1912	2055	2239	2445	2670
1980 FEB 11.0		3176	3078	2980	2883	2786	2690	2594	2498	2403	2307	2212	2117	2022	1926	1834	1730	1635	1538	1440	1342	1243
JD 2444270.5		2328	1932	1647	1444	1301	1206	1150	1127	1132	1164	1221	1305	1431	1735	4177	1886	1963	2127	2320	2534	2765
1980 FEB 1.0		3132	3034	2936	2839	2742	2646	2550	2454	2359	2264	2168	2073	1978	1883	1776	1687	1591	1494	1396	1298	1199
JD 2444260.5		2148	1806	1560	1385	1264	1186	1144	1133	1149	1190	1257	1356	1520	2451	2100	1895	2026	2204	2406	2627	2864
1980 JAN 22.0		3088	2990	2892	2795	2698	2602	2506	2411	2315	2220	2125	2029	1934	1842	1739	1644	1547	1450	1352	1254	1155
JD 2444250.5		1992	1696	1484	1334	1233	1171	1143	1143	1169	1221	1299	1417	1682	5504	1890	1941	2098	2286	2496	2723	2967
1980 JAN 12.0		3044	2946	2848	2751	2654	2558	2462	2367	2271	2176	2081	1986	1891	1780	1696	1600	1503	1406	1308	1210	1111
JD 2444240.5		1857	1602	1419	1292	1209	1162	1146	1157	1194	1256	1348	1499	2207	2200	1882	2003	2175	2373	2590	2824	3075
1980 JAN 2.0		3000	2902	2804	2707	2610	2514	2418	2322	2227	2132	2036	1942	1848	1746	1652	1556	1459	1362	1264	1166	1067
JD 2444230.5		1739	1520	1364	1258	1192	1159	1154	1177	1223	1296	1406	1638	6706	1894	1924	2075	2258	2464	2688	2929	3186
1979 DEC 23.0		2956	2857	2760	2662	2566	2469	2373	2278	2182	2087	1992	1898	1818	1703	1608	1512	1415	1317	1220	1121	1022
JD 2444220.5		1637	1449	1318	1231	1180	1160	1167	1200	1257	1343	1481	2039	2294	1871	1985	2153	2346	2559	2791	3038	3302
1979 DEC 13.0		2911	2812	2715	2617	2521	2424	2328	2233	2137	2042	1947	1854	1752	1659	1563	1467	1370	1273	1175	1076	977
JD 2444210.5		1549	1389	1280	1210	1174	1166	1185	1228	1296	1398	1601	5603	1892	1910	2057	2237	2439	2660	2898	3152	3422
1979 DEC 3.0		2865	2767	2669	2572	2475	2379	2283	2188	2092	1997	1902	1818	1708	1614	1518	1421	1325	1227	1130	1031	932
JD 2444200.5		1472	1338	1249	1196	1173	1178	1207	1261	1341	1467	1920	2346	1860	1971	2136	2326	2536	2764	3010	3271	3547
1979 NOV 23.0		2820	2721	2624	2526	2430	2333	2237	2142	2047	1952	1858	1757	1663	1568	1472	1376	1279	1182	1084	985	886
	(FLT T)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)

JD2443600.5 1978 APR 2.0 | JD2443640.5 1978 MAY 12.0 | JD2443680.5 1978 JUN 21.0 | JD2443720.5 1978 JUL 31.0 | JD2443760.5 1978 SEP 9.0

EARTH DEPARTURE OR ARRIVAL DATE

M16
E08

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444060.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671778	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.588	DEGREES
MEAN ANOM. AT EPOCH	=	180.800	DEGREES
DATE OF NODAL PASSAGE	=	2444140.132	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444060.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338652	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.399	DEGREES
ARG. OF PERIHELION	=	286.282	DEGREES
MEAN ANOM. AT EPOCH	=	57.353	DEGREES
DATE OF NODAL PASSAGE	=	2444072.530	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.059	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E08

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)
JD 2444320.5	585	640	698	758	819	883	947	1013	1080	1147	1213	1280	1346	1410	0	1225	998	823	696	605	538
1980 MAR 22.0	431	458	487	518	551	586	623	661	701	741	783	825	868	910	0	738	571	439	339	266	213
JD 2444310.5	605	661	719	780	842	907	972	1039	1106	1173	1241	1307	1373	1438	1367	1121	918	767	658	580	522
1980 MAR 12.0	442	470	500	532	565	601	638	677	717	758	800	843	885	928	839	661	510	393	306	242	196
JD 2444300.5	624	681	741	802	866	931	997	1065	1132	1200	1268	1335	1401	0	1257	1028	849	719	627	560	510
1980 MAR 2.0	454	483	513	546	580	617	655	694	734	776	818	861	904	0	760	592	456	353	277	221	184
JD 2444290.5	644	702	763	826	890	956	1023	1091	1159	1227	1295	1363	1429	1397	1152	945	790	680	601	543	501
1980 FEB 21.0	467	496	528	561	596	633	671	711	752	794	837	879	922	861	684	529	408	318	252	205	176
JD 2444280.5	665	724	786	849	914	981	1049	1117	1186	1255	1323	1390	1456	1288	1056	873	741	647	579	531	495
1980 FEB 11.0	481	511	543	577	612	650	689	729	771	813	856	899	942	783	613	473	367	288	231	193	171
JD 2444270.5	686	746	809	873	939	1007	1075	1144	1213	1283	1351	1418	1426	1181	970	812	699	619	563	522	492
1980 FEB 1.0	495	526	558	593	630	668	707	748	790	833	876	919	884	707	549	424	331	262	214	185	172
JD 2444260.5	707	769	832	897	964	1033	1102	1171	1241	1310	1379	1446	1316	1082	895	760	665	597	550	516	492
1980 JAN 22.0	510	541	575	610	647	686	726	768	810	853	896	939	808	636	492	381	300	241	202	181	177
JD 2444250.5	730	792	856	922	990	1059	1129	1199	1269	1339	1407	1452	1208	993	831	716	636	580	541	513	495
1980 JAN 12.0	525	557	592	628	666	705	746	788	830	874	917	909	732	570	441	344	273	224	194	183	186
JD 2444240.5	752	816	881	948	1016	1086	1156	1227	1297	1367	1436	1343	1106	914	776	680	613	567	535	514	500
1980 JAN 2.0	541	574	609	646	685	725	766	809	852	895	939	834	659	510	396	311	251	212	192	189	200
JD 2444230.5	776	840	906	974	1043	1113	1184	1255	1326	1396	1464	1232	1012	847	730	650	596	558	533	517	508
1979 DEC 23.0	558	592	628	666	705	746	788	830	874	918	962	756	590	457	356	284	234	205	194	200	218
JD 2444220.5	800	865	932	1001	1071	1141	1213	1284	1355	1425	1365	1125	930	789	693	627	582	553	534	524	520
1979 DEC 13.0	576	611	647	686	726	767	810	853	897	941	859	681	527	409	323	261	222	203	202	216	240
JD 2444210.5	825	891	958	1028	1098	1170	1242	1313	1384	1454	1251	1028	859	741	662	609	573	551	538	533	534
1979 DEC 3.0	594	630	668	707	748	790	833	876	920	965	780	609	471	368	294	244	215	207	215	237	266
JD 2444200.5	850	917	986	1056	1127	1199	1271	1343	1414	1483	1140	941	798	702	638	595	569	553	547	547	553
1979 NOV 23.0	613	650	689	729	770	813	856	900	945	884	702	543	422	333	271	232	215	217	234	262	297

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)

JD2443800.5 1978 OCT 19.0 | JD2443840.5 1978 NOV 28.0 | JD2443880.5 1979 JAN 7.0 | JD2443920.5 1979 FEB 16.0 | JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E08

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)
JD 2444320.5	145	157	172	188	203	217	228	236	242	243	241	236	227	215	0	94	98	109	124	141	157
1980 MAR 22.0	229	296	364	434	505	579	654	730	807	885	963	1040	1116	1190	0	295	314	351	401	461	528
JD 2444310.5	136	150	166	183	199	213	226	235	241	243	242	237	229	217	78	80	88	102	119	138	155
1980 MAR 12.0	217	284	352	421	492	565	640	716	793	871	949	1026	1101	1176	251	263	290	334	389	453	522
JD 2444300.5	127	143	161	178	195	210	223	233	240	243	242	238	231	0	62	67	79	96	115	135	152
1980 MAR 2.0	206	272	339	408	479	552	627	702	779	857	934	1011	1087	0	216	235	270	320	379	446	517
JD 2444290.5	119	136	155	174	191	207	220	231	238	242	243	239	233	46	48	57	72	91	112	132	151
1980 FEB 21.0	194	260	327	396	466	539	613	688	765	842	919	996	1071	172	184	211	253	308	371	440	513
JD 2444280.5	111	130	149	169	187	203	217	229	237	242	243	240	234	30	35	47	66	87	109	131	150
1980 FEB 11.0	182	247	314	383	453	525	599	674	750	827	904	981	1056	137	155	190	239	298	364	435	509
JD 2444270.5	104	123	144	164	183	200	214	226	235	241	243	241	13	15	24	40	61	84	107	129	149
1980 FEB 1.0	170	235	302	370	440	512	585	660	736	812	889	965	94	105	131	173	227	290	358	431	506
JD 2444260.5	96	117	138	159	178	196	211	224	233	240	242	241	-2	2	14	34	57	81	106	128	148
1980 JAN 22.0	158	223	290	358	427	499	571	646	721	797	873	949	59	76	110	159	218	283	353	427	504
JD 2444250.5	89	110	132	153	174	192	208	221	231	238	242	-19	-18	-9	7	29	54	80	105	128	148
1980 JAN 12.0	146	211	277	345	414	485	557	631	706	782	857	14	26	51	93	147	209	277	349	424	501
JD 2444240.5	82	104	126	148	169	188	204	218	229	237	241	-36	-31	-18	1	25	51	78	104	127	148
1980 JAN 2.0	134	198	264	332	401	471	543	616	691	766	841	3579	3596	30	78	137	202	272	345	421	499
JD 2444230.5	74	97	120	143	164	183	201	215	227	235	240	-51	-43	-26	-3	22	50	77	103	127	148
1979 DEC 23.0	122	186	252	319	387	457	529	601	675	750	825	3546	3570	12	66	128	196	268	342	418	497
JD 2444220.5	67	91	114	137	159	179	197	212	224	233	-69	-65	-53	-32	-7	20	49	77	103	127	148
1979 DEC 13.0	109	173	239	305	374	443	514	586	660	734	3498	3515	3548	3597	56	121	191	264	339	416	495
JD 2444210.5	60	84	108	132	154	174	192	208	221	231	-85	-77	-60	-37	-10	19	48	77	104	128	149
1979 DEC 3.0	97	161	226	292	360	429	499	571	644	717	3463	3487	3529	3584	47	115	187	260	336	413	492
JD 2444200.5	53	77	102	126	148	169	188	205	218	-102	-98	-86	-66	-40	-11	18	48	77	104	128	149
1979 NOV 23.0	84	148	213	278	346	414	484	555	627	3415	3431	3464	3513	3573	40	110	182	257	333	411	490

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)

JD2443800.5	JD2443840.5	JD2443880.5	JD2443920.5	JD2443960.5
1978 OCT 19.0	1978 NOV 28.0	1979 JAN 7.0	1979 FEB 16.0	1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E08

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

	(FLT T)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)
JD 2444320.5		222	230	235	237	237	236	234	231	227	223	217	211	205	197	0	169	178	181	178	169	150
1980 MAR 22.0		965	987	1009	1032	1056	1081	1106	1132	1158	1185	1211	1239	1266	1293	0	1283	1248	1246	1274	1332	1419
JD 2444310.5		225	233	237	239	240	240	238	236	233	229	224	218	212	205	172	183	187	187	181	168	145
1980 MAR 12.0		926	947	969	993	1017	1042	1068	1094	1121	1148	1176	1204	1232	1260	1273	1221	1201	1214	1258	1331	1435
JD 2444300.5		227	234	238	241	242	243	242	240	237	234	229	224	219	0	186	192	194	191	182	165	136
1980 MAR 2.0		886	907	930	954	979	1004	1030	1057	1084	1112	1140	1169	1198	0	1203	1166	1162	1190	1249	1339	1460
JD 2444290.5		227	234	239	242	244	244	244	243	241	238	234	230	225	188	196	199	198	193	181	159	124
1980 FEB 21.0		846	868	891	915	940	966	993	1020	1048	1076	1105	1134	1164	1194	1139	1117	1130	1174	1250	1357	1493
JD 2444280.5		227	233	238	242	244	245	246	245	244	241	238	235	230	199	202	203	200	193	178	151	110
1980 FEB 11.0		807	829	852	876	901	928	955	983	1011	1040	1070	1099	1129	1123	1082	1077	1105	1166	1259	1384	1532
JD 2444270.5		225	231	237	240	243	245	246	246	246	244	242	239	202	206	206	205	201	191	172	140	94
1980 FEB 1.0		768	790	813	838	863	890	917	946	975	1004	1034	1064	1113	1057	1032	1044	1089	1167	1278	1419	1573
JD 2444260.5		222	228	234	238	242	244	246	247	247	246	244	242	208	209	208	206	200	188	164	126	78
1980 JAN 22.0		729	751	775	799	825	852	880	909	938	968	999	1030	1040	997	991	1019	1082	1178	1307	1459	1612
JD 2444250.5		218	225	230	235	239	242	245	246	247	247	246	212	212	210	208	206	199	183	154	111	63
1980 JAN 12.0		690	713	736	761	787	815	843	872	902	932	963	1031	972	946	957	1003	1084	1199	1344	1501	1647
JD 2444240.5		212	220	226	231	236	240	243	245	246	247	247	214	212	209	208	204	196	176	142	97	51
1980 JAN 2.0		652	674	698	724	750	777	806	835	866	896	928	956	911	903	933	997	1097	1230	1386	1541	1676
JD 2444230.5		206	214	221	227	232	236	240	243	245	247	247	214	210	208	206	203	191	167	128	84	43
1979 DEC 23.0		614	637	661	686	713	740	769	799	829	861	893	886	859	870	917	1001	1120	1269	1429	1575	1696
JD 2444220.5		200	207	215	221	227	232	236	240	243	245	216	210	207	205	205	200	185	156	115	73	37
1979 DEC 13.0		577	599	624	649	676	704	733	763	794	825	870	824	815	846	913	1016	1154	1313	1469	1603	1709
JD 2444210.5		192	200	208	215	221	227	232	236	240	243	211	205	203	203	203	197	177	144	104	66	35
1979 DEC 3.0		539	562	587	612	639	667	697	727	758	790	798	770	782	832	919	1042	1196	1357	1503	1622	1715
JD 2444200.5		183	192	200	207	214	221	227	232	236	214	204	199	199	201	201	192	168	133	96	62	35
1979 NOV 23.0		503	526	550	576	603	631	661	691	723	782	735	727	759	829	937	1079	1241	1398	1530	1634	1714
	(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)

JD2443800.5 1978 OCT 19.0 | JD2443840.5 1978 NOV 28.0 | JD2443880.5 1979 JAN 7.0 | JD2443920.5 1979 FEB 16.0 | JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E08

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)
JD 2444320.5 1980 MAR 22.0	742	742	742	742	742	742	742	742	742	742	742	742	742	742	0	742	742	742	742	742	742
JD 2444310.5 1980 MAR 12.0	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701
JD 2444300.5 1980 MAR 2.0	680	680	680	680	680	680	680	680	680	680	680	680	680	0	680	680	680	680	680	680	680
JD 2444290.5 1980 FEB 21.0	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680
JD 2444280.5 1980 FEB 11.0	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703
JD 2444270.5 1980 FEB 1.0	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746
JD 2444260.5 1980 JAN 22.0	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
JD 2444250.5 1980 JAN 12.0	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878
JD 2444240.5 1980 JAN 2.0	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958
JD 2444230.5 1979 DEC 23.0	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044
JD 2444220.5 1979 DEC 13.0	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133
JD 2444210.5 1979 DEC 3.0	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222
JD 2444200.5 1979 NOV 23.0	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)

JD2443800.5 1978 OCT 19.0 | JD2443840.5 1978 NOV 28.0 | JD2443880.5 1979 JAN 7.0 | JD2443920.5 1979 FEB 16.0 | JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

M16
E08

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

	(FLT T)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)
JD 2444320.5		198	198	198	198	198	198	198	198	198	198	198	198	198	198	0	198	198	198	198	198	198
1980 MAR 22.0		1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	0	1457	1457	1457	1457	1457	1457
JD 2444310.5		129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129
1980 MAR 12.0		1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580
JD 2444300.5		54	54	54	54	54	54	54	54	54	54	54	54	54	0	54	54	54	54	54	54	54
1980 MAR 2.0		1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	0	1709	1709	1709	1709	1709	1709	1709
JD 2444290.5		44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
1980 FEB 21.0		1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726
JD 2444280.5		117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117
1980 FEB 11.0		1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599
JD 2444270.5		187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187
1980 FEB 1.0		1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473
JD 2444260.5		244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244
1980 JAN 22.0		1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359
JD 2444250.5		289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289
1980 JAN 12.0		1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256
JD 2444240.5		322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322
1980 JAN 2.0		1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166
JD 2444230.5		345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345
1979 DEC 23.0		1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085
JD 2444220.5		361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361
1979 DEC 13.0		1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012
JD 2444210.5		370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370
1979 DEC 3.0		947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947
JD 2444200.5		375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375
1979 NOV 23.0		887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887
	(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)

JD2443800.5 1978 OCT 19.0 | JD2443840.5 1978 NOV 28.0 | JD2443880.5 1979 JAN 7.0 | JD2443920.5 1979 FEB 16.0 | JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E08

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)
JD 2444320.5	1417	1318	1218	1117	1016	915	813	711	610	508	406	305	204	104	0	3501	3402	3304	3206	3109	3012
1980 MAR 22.0	868	938	1008	1076	1144	1212	1279	1345	1411	1476	1541	1606	1670	1734	0	-1600	-1436	-1312	-1218	-1145	-1085
JD 2444310.5	1374	1274	1174	1073	972	871	769	668	566	464	362	261	160	61	3555	3458	3359	3260	3162	3065	2968
1980 MAR 12.0	897	967	1036	1104	1172	1239	1306	1373	1438	1504	1569	1633	1698	1761	-1707	-1526	-1382	-1274	-1192	-1127	-1073
JD 2444300.5	1330	1230	1130	1030	929	827	726	624	522	420	319	217	117	0	3513	3414	3315	3217	3119	3021	2924
1980 MAR 2.0	926	995	1064	1133	1200	1267	1334	1400	1466	1531	1596	1661	1725	0	-1627	-1462	-1337	-1243	-1171	-1112	-1062
JD 2444290.5	1286	1187	1087	986	885	784	682	580	479	377	275	174	74	3566	3470	3370	3272	3173	3075	2977	2881
1980 FEB 21.0	955	1024	1093	1161	1228	1295	1361	1428	1493	1559	1624	1688	1752	-1731	-1553	-1407	-1299	-1217	-1153	-1099	-1053
JD 2444280.5	1243	1143	1043	943	842	740	639	537	435	333	232	131	34	3525	3426	3327	3228	3129	3031	2934	2837
1980 FEB 11.0	984	1053	1122	1189	1256	1323	1389	1455	1521	1586	1651	1716	1778	-1654	-1488	-1361	-1267	-1195	-1138	-1089	-1046
JD 2444270.5	1199	1099	999	899	798	696	595	493	391	289	188	88	3576	3482	3383	3283	3184	3086	2988	2890	2793
1980 FEB 1.0	1014	1082	1150	1218	1285	1351	1417	1483	1548	1614	1679	1743	-1751	-1579	-1432	-1322	-1241	-1177	-1125	-1080	-1039
JD 2444260.5	1155	1056	955	855	754	653	551	449	347	246	144	46	3538	3439	3339	3239	3140	3042	2944	2846	2749
1980 JAN 22.0	1044	1112	1179	1246	1313	1379	1445	1511	1576	1642	1707	1770	-1679	-1513	-1385	-1290	-1219	-1162	-1114	-1072	-1034
JD 2444250.5	1111	1012	911	811	710	609	507	405	303	202	101	3581	3495	3395	3295	3195	3096	2998	2900	2802	2705
1980 JAN 12.0	1074	1141	1208	1275	1342	1408	1473	1539	1604	1670	1735	-1763	-1605	-1456	-1345	-1263	-1201	-1149	-1106	-1066	-1029
JD 2444240.5	1067	967	867	767	666	564	463	361	259	158	58	3550	3451	3351	3251	3151	3052	2953	2855	2758	2661
1980 JAN 2.0	1104	1171	1238	1304	1370	1436	1502	1567	1633	1698	1762	-1704	-1537	-1407	-1312	-1241	-1185	-1139	-1098	-1060	-1024
JD 2444230.5	1022	923	823	722	621	520	418	316	215	114	21	3507	3407	3306	3206	3107	3007	2909	2811	2713	2616
1979 DEC 23.0	1134	1201	1267	1333	1399	1465	1530	1596	1661	1726	1786	-1628	-1477	-1366	-1285	-1223	-1173	-1130	-1091	-1055	-1020
JD 2444220.5	977	878	778	677	576	475	373	272	170	70	3561	3463	3362	3262	3161	3062	2963	2864	2766	2668	2571
1979 DEC 13.0	1165	1231	1297	1363	1429	1494	1559	1625	1690	1755	-1726	-1558	-1427	-1332	-1262	-1208	-1162	-1122	-1085	-1050	-1015
JD 2444210.5	932	833	732	632	531	430	328	226	125	28	3518	3418	3317	3216	3116	3017	2917	2819	2721	2623	2526
1979 DEC 3.0	1195	1261	1327	1393	1458	1523	1589	1654	1719	1782	-1649	-1497	-1385	-1305	-1244	-1195	-1153	-1115	-1080	-1045	-1011
JD 2444200.5	886	787	687	586	485	384	282	181	80	3571	3473	3372	3271	3171	3071	2971	2872	2773	2675	2577	2480
1979 NOV 23.0	1226	1292	1357	1423	1488	1553	1618	1683	1748	-1744	-1578	-1445	-1351	-1282	-1229	-1184	-1145	-1109	-1074	-1040	-1006
(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)

JD2443800.5 1978 OCT 19.0 | JD2443840.5 1978 NOV 28.0 | JD2443880.5 1979 JAN 7.0 | JD2443920.5 1979 FEB 16.0 | JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

M16
E08

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)
JD 2444320.5	265	220	193	176	167	164	166	173	187	212	252	323	471	915	0	957	485	332	258	217	192
1980 MAR 22.0	576	610	646	684	722	762	801	839	876	910	939	964	983	996	0	951	842	727	631	557	503
JD 2444310.5	251	214	191	178	171	170	174	185	204	235	288	387	617	1621	2219	692	416	304	246	211	190
1980 MAR 12.0	586	621	658	697	736	776	815	853	889	922	950	973	989	998	989	908	792	685	600	536	489
JD 2444300.5	239	209	190	180	175	176	183	198	221	261	332	473	867	0	1163	550	367	282	235	207	189
1980 MAR 2.0	597	633	671	710	750	790	830	867	902	934	960	981	994	0	963	859	745	648	574	519	478
JD 2444290.5	229	204	189	181	179	183	193	211	242	293	388	600	1401	3191	797	460	330	264	226	202	188
1980 FEB 21.0	609	646	685	724	765	805	844	881	915	945	969	987	998	994	923	810	703	617	552	505	471
JD 2444280.5	220	200	188	183	183	189	203	226	265	332	463	808	3278	1415	611	397	301	249	217	198	187
1980 FEB 11.0	621	659	698	739	779	820	858	895	927	955	977	993	999	973	876	763	665	590	534	494	465
JD 2444270.5	212	196	187	184	187	196	214	243	292	380	572	1217	4998	906	498	351	277	235	210	195	187
1980 FEB 1.0	634	672	712	753	794	834	873	908	939	965	985	997	997	937	827	719	633	567	520	486	463
JD 2444260.5	205	192	186	186	191	204	226	262	325	445	743	2388	1734	668	421	314	257	224	203	191	186
1980 JAN 22.0	647	686	727	768	809	849	887	921	950	974	991	999	981	892	779	681	605	549	509	481	463
JD 2444250.5	198	188	185	187	195	212	239	284	366	536	1060	8310	1019	528	364	285	240	213	197	188	185
1930 JAN 12.0	660	701	742	784	825	864	901	933	961	982	995	998	949	843	735	647	581	534	501	479	465
JD 2444240.5	191	185	184	189	200	220	254	311	420	676	1849	2154	716	436	321	260	225	203	190	184	184
1980 JAN 2.0	675	716	758	799	840	879	914	945	970	989	998	987	905	794	694	618	562	523	496	479	471
JD 2444230.5	185	181	183	190	205	230	272	345	495	923	6015	1129	548	369	285	239	211	194	184	181	183
1979 DEC 23.0	690	731	774	815	856	893	927	956	979	994	1000	959	856	748	659	594	547	515	494	483	479
JD 2444220.5	179	178	182	192	210	241	293	389	608	1483	2723	751	440	319	256	220	198	185	179	178	182
1979 DEC 13.0	705	747	790	831	871	908	940	967	986	998	992	917	807	706	630	574	536	511	495	489	489
JD 2444210.5	173	174	180	194	216	254	319	449	801	3825	1226	554	365	279	231	203	186	177	173	174	181
1979 DEC 3.0	721	764	806	848	886	922	952	976	992	1000	967	868	759	670	605	559	528	509	500	498	503
JD 2444200.5	167	170	179	196	223	269	353	539	121[illegible]	3506	764	432	308	245	209	188	175	168	167	171	180
1979 NOV 23.0	738	781	823	864	902	935	963	984	997	996	927	817	716	639	585	547	524	511	507	510	521

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)

JD2443800.5	JD2443840.5	JD2443880.5	JD2443920.5	JD2443960.5
1978 OCT 19.0	1978 NOV 28.0	1979 JAN 7.0	1979 FEB 16.0	1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E08

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)
JD 2444320.5	-652	-591	-528	-465	-401	-338	-277	-219	-166	-118	-77	-44	-20	-4	0	54	174	302	410	496	564
1980 MAR 22.0	2425	2444	2461	2477	2492	2504	2513	2519	2522	2520	2513	2502	2485	2463	0	2156	2029	1907	1813	1746	1703
JD 2444310.5	-629	-567	-504	-440	-376	-313	-253	-197	-146	-101	-63	-33	-12	-1	12	101	228	346	443	519	579
1980 MAR 12.0	2417	2435	2452	2467	2481	2491	2499	2504	2504	2500	2492	2478	2459	2434	2192	2088	1960	1852	1773	1719	1686
JD 2444300.5	-606	-543	-479	-415	-351	-289	-230	-176	-127	-84	-49	-23	-6	0	41	152	277	385	470	538	591
1980 MAR 2.0	2408	2425	2441	2456	2468	2478	2484	2487	2486	2480	2469	2453	2431	0	2136	2017	1897	1804	1739	1698	1674
JD 2444290.5	-582	-519	-454	-390	-326	-265	-208	-155	-108	-69	-37	-15	-2	6	83	204	322	418	494	553	600
1980 FEB 21.0	2398	2415	2431	2444	2455	2464	2468	2469	2466	2458	2445	2426	2402	2165	2071	1948	1842	1764	1712	1681	1667
JD 2444280.5	-557	-494	-429	-365	-302	-242	-186	-135	-91	-55	-27	-8	-0	29	132	254	361	446	513	565	607
1980 FEB 11.0	2386	2405	2419	2432	2441	2448	2451	2450	2445	2435	2419	2398	2372	2113	2001	1885	1793	1729	1690	1670	-1664
JD 2444270.5	-532	-468	-403	-339	-277	-219	-165	-116	-75	-42	-17	-3	3	67	183	298	394	469	528	575	612
1980 FEB 1.0	2378	2393	2407	2418	2427	2432	2433	2430	2423	2410	2392	2369	2134	2051	1933	1828	1751	1701	1674	1663	-1667
JD 2444260.5	-507	-442	-377	-314	-253	-196	-144	-98	-60	-30	-10	-0	20	114	232	338	423	489	541	582	615
1980 JAN 22.0	2367	2382	2394	2404	2411	2414	2414	2409	2399	2385	2364	2338	2087	1983	1869	1778	1716	1679	1662	-1661	-1675
JD 2444250.5	-481	-416	-351	-289	-229	-174	-124	-81	-46	-21	-5	2	53	163	277	372	447	505	550	587	617
1980 JAN 12.0	2356	2369	2380	2389	2394	2396	2394	2387	2375	2357	2334	2101	2027	1914	1811	1735	1688	1663	-1656	-1665	-1689
JD 2444240.5	-454	-389	-325	-264	-206	-152	-105	-66	-34	-12	-1	13	97	212	317	401	467	517	558	590	616
1980 JAN 2.0	2344	2356	2366	2373	2377	2377	2372	2363	2349	2329	2303	2057	1960	1849	1760	1700	1666	1652	-1655	-1675	-1710
JD 2444230.5	-427	-362	-299	-239	-183	-132	-87	-51	-24	-6	0	42	146	258	352	426	483	527	562	591	614
1979 DEC 23.0	2331	2342	2351	2356	2358	2356	2349	2338	2321	2299	2270	2000	1891	1790	1716	1671	1649	-1646	-1661	-1692	-1740
JD 2444220.5	-400	-335	-273	-214	-160	-112	-71	-38	-15	-2	8	84	195	299	382	446	495	534	565	590	611
1979 DEC 13.0	2317	2327	2335	2338	2338	2334	2325	2311	2292	2267	2024	1934	1825	1738	1680	1649	-1638	-1647	-1674	-1717	-1780
JD 2444210.5	-372	-308	-247	-190	-139	-93	-55	-27	-8	0	33	132	242	335	407	462	505	539	566	587	606
1979 DEC 3.0	2303	2312	2317	2320	2317	2311	2300	2283	2261	2234	1969	1865	1765	1694	1651	1633	-1635	-1655	-1694	-1752	-1832
JD 2444200.5	-344	-281	-222	-167	-118	-76	-42	-17	-3	4	72	181	283	365	427	475	512	541	564	583	599
1979 NOV 23.0	2289	2296	2299	2300	2295	2287	2273	2254	2229	1988	1904	1798	1717	1657	1629	-1623	-1638	-1671	-1723	-1798	-1901
(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)

JD2443800.5 1978 OCT 19.0 | JD2443840.5 1978 NOV 28.0 | JD2443880.5 1979 JAN 7.0 | JD2443920.5 1979 FEB 16.0 | JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E08

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)
JD 2444320.5	142	137	132	128	124	120	117	113	111	108	106	104	102	100	0	1096	609	464	398	359	332
1980 MAR 22.0	264	257	250	243	237	231	225	220	214	209	205	200	196	193	0	343	337	329	320	311	301
JD 2444310.5	139	135	130	126	122	118	115	112	109	106	104	102	101	100	2369	801	534	433	381	348	324
1980 MAR 12.0	259	252	246	239	233	227	221	216	210	206	201	197	193	190	344	339	332	323	314	305	295
JD 2444300.5	137	132	128	124	120	116	113	110	108	105	103	101	100	0	1261	651	484	410	368	339	317
1980 MAR 2.0	255	248	241	235	228	223	217	212	207	202	198	193	190	0	340	334	326	317	308	298	288
JD 2444290.5	135	130	126	122	118	115	112	109	106	104	102	100	99	3200	881	562	449	392	356	331	311
1980 FEB 21.0	250	243	237	230	224	218	213	208	203	198	194	190	186	341	336	329	320	311	302	292	282
JD 2444280.5	133	128	124	120	116	113	110	107	105	103	101	99	98	1485	698	505	423	377	347	324	305
1980 FEB 11.0	246	239	232	226	220	214	209	204	199	195	191	187	183	337	331	323	314	305	295	285	275
JD 2444270.5	130	126	122	118	115	111	108	106	103	101	100	98	4572	980	594	465	403	365	338	317	299
1980 FEB 1.0	241	234	228	222	216	210	205	200	196	191	187	183	337	333	326	317	308	299	289	279	269
JD 2444260.5	128	124	120	116	113	110	107	104	102	100	99	97	1797	752	527	436	387	355	331	311	294
1980 JAN 22.0	237	230	224	218	212	207	201	197	192	188	184	180	334	328	320	311	302	292	282	272	262
JD 2444250.5	126	122	118	114	111	108	105	103	101	99	98	5960	1099	628	482	414	374	346	324	305	289
1980 JAN 12.0	232	226	220	214	208	203	198	193	188	184	180	334	329	323	314	305	295	286	275	265	255
JD 2444240.5	124	120	116	113	110	107	104	102	100	98	97	2243	813	551	450	397	363	338	317	300	284
1980 JAN 2.0	228	221	215	210	204	199	194	189	185	181	177	331	325	317	308	299	289	279	269	258	248
JD 2444230.5	122	118	114	111	108	105	103	101	99	97	96	1241	663	499	426	383	353	330	311	294	279
1979 DEC 23.0	223	217	211	206	200	195	190	186	181	178	174	326	320	311	302	292	282	272	262	251	241
JD 2444220.5	120	116	113	109	106	104	101	99	98	96	2893	878	574	463	407	371	345	324	305	289	274
1979 DEC 13.0	219	213	207	202	196	191	187	182	178	174	327	322	314	305	296	286	276	265	255	244	234
JD 2444210.5	118	114	111	108	105	102	100	98	97	95	1406	699	516	437	391	361	337	317	300	284	269
1979 DEC 3.0	215	209	203	198	192	188	183	179	175	171	323	317	308	299	289	279	269	258	248	237	226
JD 2444200.5	116	113	109	106	104	101	99	97	96	3852	944	596	476	416	379	352	330	311	294	279	264
1979 NOV 23.0	211	205	199	194	189	184	179	175	171	324	319	311	302	293	282	272	262	251	241	230	219

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)

JD2443800.5 1978 OCT 19.0 | JD2443840.5 1978 NOV 28.0 | JD2443880.5 1979 JAN 7.0 | JD2443920.5 1979 FEB 16.0 | JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E08

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

	(FLT T) (520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)
JD 2444320.5 1980 MAR 22.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	772	772	772	772	772	772
JD 2444310.5 1980 MAR 12.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444300.5 1980 MAR 2.0	772	772	772	772	772	772	772	772	772	772	772	772	772	0	772	772	772	772	772	772	772
JD 2444290.5 1980 FEB 21.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444280.5 1980 FEB 11.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444270.5 1980 FEB 1.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444260.5 1980 JAN 22.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444250.5 1980 JAN 12.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444240.5 1980 JAN 2.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444230.5 1979 DEC 23.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444220.5 1979 DEC 13.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444210.5 1979 DEC 3.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444200.5 1979 NOV 23.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)

JD2443800.5 1978 OCT 19.0 | JD 2443840.5 1978 NOV 28.0 | JD2443880.5 1979 JAN 7.0 | JD2443920.5 1979 FEB 16.0 | JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

M16
E08

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)
JD 2444320.5	1285	1426	1576	1735	1901	2075	2253	2437	2624	2813	3004	3194	3383	3569	0	3037	2395	1912	1572	1335	1168
1980 MAR 22.0	1040	1115	1198	1286	1381	1482	1588	1699	1814	1933	2054	2178	2303	2428	0	1922	1440	1063	787	592	458
JD 2444310.5	1334	1478	1632	1795	1964	2141	2323	2509	2698	2889	3081	3272	3462	3648	3443	2742	2172	1759	1472	1271	1129
1980 MAR 12.0	1072	1150	1235	1326	1423	1526	1633	1746	1863	1983	2105	2229	2355	2480	2218	1700	1264	934	696	530	419
JD 2444300.5	1384	1532	1690	1856	2029	2208	2393	2581	2773	2966	3159	3351	3541	0	3128	2478	1982	1633	1390	1220	1099
1980 MAR 2.0	1107	1187	1274	1367	1466	1571	1681	1795	1913	2034	2157	2282	2408	0	1986	1498	1110	824	620	480	390
JD 2444290.5	1436	1588	1749	1918	2095	2277	2464	2655	2849	3044	3238	3431	3621	3530	2829	2247	1823	1528	1324	1180	1078
1980 FEB 21.0	1143	1226	1315	1410	1511	1618	1730	1845	1965	2087	2212	2337	2463	2282	1765	1318	977	729	555	440	371
JD 2444280.5	1489	1645	1810	1982	2162	2347	2537	2730	2926	3122	3317	3511	3701	3216	2558	2049	1690	1442	1270	1150	1064
1980 FEB 11.0	1181	1266	1358	1455	1559	1667	1781	1898	2019	2142	2268	2394	2520	2055	1561	1160	862	649	503	411	362
JD 2444270.5	1544	1704	1872	2048	2231	2419	2611	2807	3004	3201	3397	3591	3613	2912	2317	1881	1579	1372	1228	1127	1056
1980 FEB 1.0	1221	1309	1402	1502	1608	1719	1834	1953	2075	2200	2326	2452	2351	1834	1376	1022	764	583	462	392	363
JD 2444260.5	1601	1765	1936	2115	2301	2492	2686	2884	3083	3281	3478	3672	3298	2632	2110	1741	1489	1316	1196	1113	1055
1980 JAN 22.0	1263	1353	1449	1552	1659	1772	1889	2010	2133	2259	2386	2513	2128	1626	1212	902	680	528	433	384	374
JD 2444250.5	1660	1827	2002	2184	2373	2566	2763	2962	3163	3362	3560	3690	2989	2381	1933	1625	1415	1272	1174	1107	1061
1980 JAN 12.0	1307	1400	1499	1603	1713	1828	1946	2069	2194	2320	2448	2424	1905	1435	1068	799	610	486	414	387	396
JD 2444240.5	1721	1892	2070	2255	2446	2642	2841	3042	3244	3444	3642	3373	2698	2162	1785	1529	1356	1239	1160	1107	1074
1980 JAN 2.0	1353	1449	1550	1657	1769	1886	2006	2130	2256	2384	2512	2203	1692	1264	942	711	554	456	408	402	428
JD 2444230.5	1784	1958	2140	2328	2522	2720	2921	3123	3326	3527	3724	3056	2435	1976	1662	1452	1311	1217	1154	1116	1094
1979 DEC 23.0	1402	1500	1604	1713	1827	1946	2068	2194	2321	2450	2579	1977	1494	1112	834	638	510	439	414	428	472
JD 2444220.5	1849	2026	2211	2402	2599	2799	3002	3206	3409	3610	3437	2753	2205	1820	1562	1391	1278	1203	1157	1132	1122
1979 DEC 13.0	1453	1553	1660	1771	1888	2009	2133	2260	2388	2518	2277	1757	1314	980	742	580	481	435	433	467	527
JD 2444210.5	1916	2097	2285	2478	2677	2880	3084	3289	3493	3695	3111	2477	2009	1691	1482	1344	1255	1200	1168	1156	1158
1979 DEC 3.0	1506	1609	1718	1832	1951	2074	2200	2328	2458	2588	2047	1549	1154	866	665	535	465	445	465	517	593
JD 2444200.5	1985	2169	2360	2557	2758	2962	3168	3374	3579	3488	2795	2235	1844	1587	1419	1311	1243	1205	1188	1188	1204
1979 NOV 23.0	1561	1667	1779	1896	2017	2142	2269	2399	2530	2349	1818	1360	1014	769	605	506	464	469	511	580	672

(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)

JD2443800.5 1978 OCT 19.0 | JD2443840.5 1978 NOV 28.0 | JD2443880.5 1979 JAN 7.0 | JD2443920.5 1979 FEB 16.0 | JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M16 E08

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)
JD 2444320.5	2325	2541	2774	3021	3283	3557	3842	4136	4438	4746	5058	5372	5685	5997	0	4959	3835	2975	2359	1927	1625
1980 MAR 22.0	1417	1318	1218	1117	1016	915	813	711	610	508	406	305	204	104	0	3501	3402	3304	3206	3109	3012
JD 2444310.5	2406	2629	2867	3121	3387	3666	3956	4255	4561	4872	5186	5502	5816	6128	5660	4442	3435	2693	2168	1801	1548
1980 MAR 12.0	1374	1274	1174	1073	972	871	769	668	566	464	362	261	160	61	3555	3458	3359	3260	3162	3065	2968
JD 2444300.5	2490	2719	2964	3223	3495	3779	4073	4376	4686	5000	5317	5634	5949	0	5114	3976	3092	2456	2010	1700	1490
1980 MAR 2.0	1330	1230	1130	1030	929	827	726	624	522	420	319	217	117	0	3513	3414	3315	3217	3119	3021	2924
JD 2444290.5	2578	2813	3064	3329	3606	3895	4194	4501	4814	5131	5450	5768	6084	5812	4594	3565	2800	2257	1879	1620	1449
1980 FEB 21.0	1286	1187	1087	986	885	784	682	580	479	377	275	174	74	3566	3470	3370	3272	3173	3075	2977	2881
JD 2444280.5	2670	2911	3168	3438	3721	4014	4318	4628	4945	5264	5585	5905	6221	5271	4118	3209	2552	2091	1773	1560	1426
1980 FEB 11.0	1243	1143	1043	943	842	740	639	537	435	333	232	131	34	3525	3426	3327	3228	3129	3031	2934	2837
JD 2444270.5	2765	3013	3275	3551	3839	4137	4445	4759	5079	5401	5723	6044	5964	4747	3693	2903	2343	1955	1690	1519	1419
1980 FEB 1.0	1199	1099	999	899	798	696	595	493	391	289	188	88	3576	3482	3383	3283	3184	3086	2988	2890	2793
JD 2444260.5	2864	3118	3386	3667	3960	4264	4575	4894	5216	5540	5864	6185	5426	4258	3322	2643	2169	1844	1629	1497	1430
1980 JAN 22.0	1155	1056	955	855	754	653	551	449	347	246	144	46	3538	3439	3339	3239	3140	3042	2944	2846	2749
JD 2444250.5	2967	3227	3501	3788	4086	4394	4710	5031	5356	5682	6007	6114	4894	3816	3001	2424	2026	1758	1588	1494	1457
1980 JAN 12.0	1111	1012	911	811	710	609	507	405	303	202	101	3581	3495	3395	3295	3195	3096	2998	2900	2802	2705
JD 2444240.5	3075	3340	3620	3912	4215	4528	4847	5172	5500	5828	6154	5576	4390	3426	2727	2241	1910	1695	1568	1509	1503
1980 JAN 2.0	1067	967	867	767	666	564	463	361	259	158	58	3550	3451	3351	3251	3151	3052	2953	2855	2758	2661
JD 2444230.5	3186	3458	3743	4041	4349	4666	4989	5317	5647	5976	6303	5033	3929	3089	2496	2090	1821	1655	1569	1544	1566
1979 DEC 23.0	1022	923	823	722	621	520	418	316	215	114	21	3507	3407	3306	3206	3107	3007	2909	2811	2713	2616
JD 2444220.5	3302	3579	3871	4173	4486	4807	5135	5465	5797	6128	5715	4510	3519	2800	2304	1971	1758	1638	1590	1598	1648
1979 DEC 13.0	977	878	778	677	576	475	373	272	170	70	3561	3463	3362	3262	3161	3062	2963	2864	2766	2668	2571
JD 2444210.5	3422	3706	4003	4311	4628	4953	5284	5617	5951	6283	5158	4027	3163	2557	2147	1880	1720	1644	1633	1673	1751
1979 DEC 3.0	932	833	732	632	531	430	328	226	125	28	3518	3418	3317	3216	3116	3017	2917	2819	2721	2623	2526
JD 2444200.5	3547	3837	4139	4452	4775	5104	5437	5773	6108	5838	4613	3595	2859	2356	2023	1817	1707	1673	1699	1769	1876
1979 NOV 23.0	886	787	687	586	485	384	282	181	80	3571	3473	3372	3271	3171	3071	2971	2872	2773	2675	2577	2480
(FLT T)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)

JD2443800.5 1978 OCT 19.0 | JD2443840.5 1978 NOV 28.0 | JD2443880.5 1979 JAN 7.0 | JD2443920.5 1979 FEB 16.0 | JD2443960.5 1979 MAR 28.0

EARTH DEPARTURE OR ARRIVAL DATE

M16
E09

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444160.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671766	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.593	DEGREES
MEAN ANOM. AT EPOCH	=	279.360	DEGREES
DATE OF NODAL PASSAGE	=	2444140.128	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444160.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338677	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.402	DEGREES
ARG. OF PERIHELION	=	286.285	DEGREES
MEAN ANOM. AT EPOCH	=	109.755	DEGREES
DATE OF NODAL PASSAGE	=	2444072.527	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.060	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E09

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)
JD 2444320.5	538	488	451	421	398	380	365	354	344	337	333	337	415	545	328	305	294	286	279	274	273
1980 MAR 22.0	213	176	155	147	150	162	178	198	219	242	267	296	363	441	362	379	402	425	448	471	494
JD 2444310.5	522	480	447	422	402	387	375	366	359	355	356	375	852	401	347	335	329	324	320	319	321
1980 MAR 12.0	196	167	153	152	161	177	196	218	242	268	295	333	633	391	397	421	448	476	504	533	562
JD 2444300.5	510	474	446	425	408	396	387	381	377	377	384	446	715	395	375	371	369	369	370	373	380
1980 MAR 2.0	184	163	156	161	175	194	217	241	268	296	329	390	553	416	439	469	501	534	569	605	643
JD 2444290.5	501	470	447	430	417	408	402	399	398	402	422	722	478	417	412	414	417	422	429	440	455
1980 FEB 21.0	176	162	163	174	192	214	239	267	296	328	368	563	450	456	488	524	562	602	644	690	739
JD 2444280.5	495	469	450	437	427	422	419	419	423	433	484	948	467	453	457	465	475	487	502	522	552
1980 FEB 11.0	171	166	173	189	211	237	265	295	327	364	422	708	475	505	544	587	632	681	734	792	858
JD 2444270.5	492	471	456	446	441	438	439	443	451	473	672	561	495	499	511	526	544	566	593	628	678
1980 FEB 1.0	172	174	187	208	233	262	293	326	363	407	546	515	521	562	609	660	715	776	843	919	1008
JD 2444260.5	492	475	465	459	456	458	462	470	485	531	1250	545	539	554	575	599	628	663	707	765	850
1980 JAN 22.0	177	186	205	229	258	290	324	362	403	461	912	540	578	629	685	746	814	890	976	1078	1204
JD 2444250.5	495	483	476	474	475	480	489	503	527	669	649	580	595	621	651	688	731	785	854	950	0
1980 JAN 12.0	186	202	225	254	286	322	360	401	450	560	586	593	646	706	774	848	933	1030	1145	1286	0
JD 2444240.5	500	492	490	492	497	507	521	541	585	1564	629	634	664	701	745	797	861	942	1052	0	0
1980 JAN 2.0	200	221	249	282	318	357	399	446	507	1131	611	661	725	798	880	973	1080	1208	1365	0	0
JD 2444230.5	508	505	507	513	523	538	557	587	696	741	674	704	746	798	859	934	1028	1152	0	0	0
1979 DEC 23.0	218	245	277	313	353	396	444	498	595	663	674	741	819	907	1008	1126	1266	1440	0	0	0
JD 2444220.5	520	521	527	538	554	574	601	646	1393	720	741	788	847	917	1002	1110	1250	0	0	0	0
1979 DEC 13.0	240	272	308	348	393	441	494	559	1037	692	755	837	931	1040	1167	1320	1510	0	0	0	0
JD 2444210.5	534	541	552	568	589	616	652	745	834	778	827	892	971	1067	1187	1343	0	0	0	0	0
1979 DEC 3.0	266	302	343	388	437	491	553	645	746	767	852	951	1068	1204	1369	1574	0	0	0	0	0
JD 2444200.5	553	564	581	603	630	665	716	1265	820	863	933	1020	1126	1259	1432	0	0	0	0	0	0
1979 NOV 23.0	297	337	383	433	488	549	621	981	782	864	969	1091	1237	1413	1633	0	0	0	0	0	0

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E09

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)
JD 2444320.5	157	171	182	189	192	189	181	167	145	113	65	-23	-279	569	334	233	180	148	128	119	118
1980 MAR 22.0	528	600	675	752	831	909	987	1063	1136	1205	1267	1317	1340	2046	1664	1662	1687	1713	1731	1737	1728
JD 2444310.5	155	169	180	188	190	187	178	163	139	103	44	-83	-592	443	276	203	161	132	113	103	101
1980 MAR 12.0	522	596	672	750	829	908	987	1063	1136	1205	1265	1311	1473	1700	1631	1654	1686	1715	1737	1748	1745
JD 2444300.5	152	168	179	186	188	185	176	159	133	91	15	-194	561	343	237	181	145	119	101	91	88
1980 MAR 2.0	517	592	669	749	828	908	987	1063	1136	1204	1263	1304	2106	1609	1613	1647	1684	1716	1741	1755	1756
JD 2444290.5	151	166	178	185	187	183	173	155	125	75	-30	-448	461	283	209	164	132	109	92	82	79
1980 FEB 21.0	513	589	667	747	828	908	987	1063	1136	1203	1259	1360	1648	1571	1601	1641	1680	1714	1740	1756	1759
JD 2444280.5	150	165	177	184	186	182	170	150	116	52	-116	523	354	245	189	151	123	101	86	77	73
1980 FEB 11.0	509	587	666	746	827	907	986	1063	1136	1201	1256	2158	1541	1550	1591	1635	1675	1710	1736	1752	1757
JD 2444270.5	149	165	177	184	185	180	168	144	104	17	-317	481	292	219	174	142	116	96	82	74	71
1980 FEB 1.0	506	584	664	745	826	907	986	1063	1135	1199	1286	1586	1501	1536	1582	1627	1668	1703	1728	1744	1749
JD 2444260.5	148	164	176	183	184	179	164	138	86	-48	450	364	255	201	163	135	112	94	81	74	72
1980 JAN 22.0	504	582	663	744	826	906	986	1062	1133	1198	2166	1463	1478	1524	1573	1619	1659	1692	1716	1730	1734
JD 2444250.5	148	164	176	183	183	177	161	129	59	-202	499	301	230	188	156	130	110	94	83	77	0
1980 JAN 12.0	501	581	661	743	825	906	985	1061	1132	1217	1513	1421	1463	1514	1564	1609	1647	1678	1700	1712	0
JD 2444240.5	148	164	176	182	183	175	156	116	10	363	372	265	214	179	151	128	110	96	87	0	0
1980 JAN 2.0	499	579	660	742	824	905	984	1060	1132	2113	1376	1399	1450	1503	1552	1596	1633	1661	1679	0	0
JD 2444230.5	148	164	176	182	182	173	150	96	-107	513	308	242	202	173	148	128	112	101	0	0	0
1979 DEC 23.0	497	577	658	740	822	903	983	1058	1146	1424	1335	1383	1438	1491	1540	1581	1614	1638	0	0	0
JD 2444220.5	148	165	176	182	181	170	140	58	-391	373	273	227	195	169	148	130	117	0	0	0	0
1979 DEC 13.0	495	575	656	739	821	902	981	1058	1464	1280	1313	1370	1426	1478	1524	1562	1591	0	0	0	0
JD 2444210.5	149	165	177	182	180	165	125	-30	517	310	251	216	190	168	149	135	0	0	0	0	0
1979 DEC 3.0	492	573	654	736	819	900	979	1069	1316	1242	1298	1357	1413	1463	1505	1539	0	0	0	0	0
JD 2444200.5	149	166	177	182	178	159	97	-310	368	277	238	210	188	169	153	0	0	0	0	0	0
1979 NOV 23.0	490	570	652	734	816	897	979	1286	1177	1223	1284	1344	1398	1444	1483	0	0	0	0	0	0
(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E09

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

	(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)
JD 2444320.5		150	120	77	26	-21	-59	-85	-102	-110	-111	-99	-62	85	-569	-337	-281	-258	-247	-239	-234	-230
1980 MAR 22.0		1419	1535	1674	1821	1957	2072	2164	2237	2296	2345	2386	2423	2446	2208	2455	2495	2522	2544	2563	2579	2594
JD 2444310.5		145	108	59	8	-35	-68	-90	-103	-108	-105	-87	-24	311	-407	-298	-265	-250	-241	-236	-232	-229
1980 MAR 12.0		1435	1566	1714	1858	1983	2085	2167	2232	2284	2329	2368	2403	2310	2361	2437	2470	2495	2517	2537	2555	2571
JD 2444300.5		136	93	42	-6	-45	-73	-92	-102	-104	-97	-67	51	-557	-329	-273	-252	-242	-236	-232	-230	-227
1980 MAR 2.0		1460	1604	1753	1889	2002	2092	2164	2222	2270	2311	2349	2381	2010	2368	2415	2444	2469	2491	2512	2531	2549
JD 2444290.5		124	76	25	-19	-53	-76	-91	-99	-98	-84	-35	243	-399	-287	-255	-241	-235	-231	-229	-227	-225
1980 FEB 21.0		1493	1644	1789	1913	2014	2093	2157	2208	2253	2292	2329	2309	2259	2353	2390	2417	2442	2464	2486	2507	2527
JD 2444280.5		110	59	10	-28	-57	-77	-89	-94	-89	-66	26	-508	-314	-259	-240	-231	-227	-225	-224	-224	-223
1980 FEB 11.0		1532	1683	1819	1930	2019	2089	2145	2192	2233	2272	2309	1813	2280	2332	2363	2390	2414	2438	2461	2483	2505
JD 2444270.5		94	43	-0	-34	-59	-75	-85	-87	-77	-39	178	-384	-268	-238	-227	-222	-220	-220	-220	-220	-221
1980 FEB 1.0		1573	1718	1842	1941	2018	2080	2131	2174	2213	2251	2268	2158	2269	2308	2337	2363	2388	2412	2437	2461	2485
JD 2444260.5		78	30	-8	-38	-58	-72	-79	-77	-61	10	-414	-291	-238	-221	-215	-213	-213	-214	-216	-217	-218
1980 JAN 22.0		1612	1748	1858	1944	2012	2067	2113	2154	2192	2232	1653	2193	2249	2282	2309	2335	2361	2387	2413	2440	2466
JD 2444250.5		63	20	-13	-38	-55	-67	-71	-66	-36	129	-359	-243	-216	-207	-204	-204	-206	-208	-211	-214	0
1980 JAN 12.0		1647	1770	1866	1942	2002	2052	2094	2132	2171	2206	2061	2185	2225	2255	2282	2309	2335	2363	2391	2420	0
JD 2444240.5		51	13	-15	-36	-51	-60	-61	-50	4	-294	-261	-211	-197	-194	-194	-196	-199	-203	-207	0	0
1980 JAN 2.0		1676	1784	1868	1935	1988	2033	2073	2110	2151	1544	2108	2166	2200	2228	2255	2283	2311	2340	2371	0	0
JD 2444230.5		43	10	-14	-32	-45	-51	-49	-28	96	-376	-211	-188	-182	-181	-184	-187	-192	-197	0	0	0
1979 DEC 23.0		1696	1791	1865	1923	1972	2013	2051	2088	2131	1970	2103	2143	2174	2201	2229	2257	2287	2319	0	0	0
JD 2444220.5		37	9	-11	-27	-37	-41	-34	5	374	-224	-179	-169	-167	-169	-174	-179	-186	0	0	0	0
1979 DEC 13.0		1709	1792	1856	1909	1953	1991	2028	2068	1921	2028	2085	2118	2147	2175	2203	2233	2266	0	0	0	0
JD 2444210.5		35	11	-7	-20	-27	-29	-14	79	-285	-174	-155	-152	-154	-158	-164	-172	0	0	0	0	0
1979 DEC 3.0		1715	1787	1844	1891	1931	1968	2005	2050	1889	2022	2062	2092	2120	2149	2179	2211	0	0	0	0	0
JD 2444200.5		35	15	-0	-11	-17	-14	15	345	-182	-143	-135	-136	-141	-148	-156	0	0	0	0	0	0
1979 NOV 23.0		1714	1777	1828	1871	1908	1944	1983	1928	1950	2005	2037	2066	2094	2124	2156	0	0	0	0	0	0
	(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)

JD2444000.5	JD2444040.5	JD2444080.5	JD2444120.5	JD2444160.5
1979 MAY 7.0	1979 JUN 16.0	1979 JUL 26.0	1979 SEP 4.0	1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16 E09

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)
JD 2444320.5 1980 MAR 22.0	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742
JD 2444310.5 1980 MAR 12.0	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701
JD 2444300.5 1980 MAR 2.0	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680
JD 2444290.5 1980 FEB 21.0	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680
JD 2444280.5 1980 FEB 11.0	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703
JD 2444270.5 1980 FEB 1.0	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746
JD 2444260.5 1980 JAN 22.0	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
JD 2444250.5 1980 JAN 12.0	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	0
JD 2444240.5 1980 JAN 2.0	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	0	0
JD 2444230.5 1979 DEC 23.0	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	0	0	0
JD 2444220.5 1979 DEC 13.0	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	0	0	0	0
JD 2444210.5 1979 DEC 3.0	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	0	0	0	0	0
JD 2444200.5 1979 NOV 23.0	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	0	0	0	0	0	0

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E09

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)
JD 2444320.5	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
1980 MAR 22.0	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457
JD 2444310.5	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129
1980 MAR 12.0	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580
JD 2444300.5	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54
1980 MAR 2.0	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709
JD 2444290.5	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
1980 FEB 21.0	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726
JD 2444280.5	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117
1980 FEB 11.0	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599
JD 2444270.5	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187
1980 FEB 1.0	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473
JD 2444260.5	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244
1980 JAN 22.0	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359
JD 2444250.5	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	0	
1980 JAN 12.0	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	0	
JD 2444240.5	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	0	0
1980 JAN 2.0	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	0	0
JD 2444230.5	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	0	0	0
1979 DEC 23.0	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	0	0	0
JD 2444220.5	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	0	0	0	0
1979 DEC 13.0	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	0	0	0	0
JD 2444210.5	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	0	0	0	0	0
1979 DEC 3.0	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	0	0	0	0	0
JD 2444200.5	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	0	0	0	0	0	0
1979 NOV 23.0	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	0	0	0	0	0	0
(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)

JD2444000.5 1979 MAY 7.0

JD2444040.5 1979 JUN 16.0

JD2444080.5 1979 JUL 26.0

JD2444120.5 1979 SEP 4.0

JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

M16
E09

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)
JD 2444320.5	3012	2915	2819	2723	2628	2532	2437	2342	2246	2151	2055	1959	1864	1761	1666	1568	1469	1370	1270	1170	1069
1980 MAR 22.0	-1085	-1034	-988	-945	-903	-863	-823	-783	-742	-700	-658	-614	-569	-517	-470	-419	-365	-309	-249	-185	-116
JD 2444310.5	2968	2871	2775	2679	2584	2488	2393	2298	2202	2107	2011	1916	1825	1719	1622	1524	1426	1327	1227	1126	1026
1980 MAR 12.0	-1073	-1025	-981	-940	-901	-861	-822	-783	-743	-702	-660	-617	-577	-523	-475	-425	-372	-317	-258	-196	-129
JD 2444300.5	2924	2828	2731	2636	2540	2445	2349	2254	2159	2063	1968	1873	1769	1676	1579	1481	1382	1283	1183	1083	982
1980 MAR 2.0	-1062	-1017	-976	-937	-898	-860	-822	-783	-743	-703	-661	-620	-569	-526	-479	-430	-378	-323	-266	-205	-139
JD 2444290.5	2881	2784	2688	2592	2496	2401	2306	2211	2115	2020	1925	1832	1728	1632	1535	1437	1338	1239	1139	1039	938
1980 FEB 21.0	-1053	-1011	-971	-933	-896	-858	-821	-782	-743	-703	-663	-623	-573	-529	-482	-432	-381	-327	-270	-210	-145
JD 2444280.5	2837	2740	2644	2548	2453	2357	2262	2167	2072	1976	1882	1775	1685	1589	1491	1393	1295	1196	1096	995	895
1980 FEB 11.0	-1046	-1006	-968	-930	-894	-857	-820	-782	-743	-703	-663	-613	-574	-529	-483	-434	-383	-329	-272	-212	-148
JD 2444270.5	2793	2697	2600	2505	2409	2314	2219	2123	2028	1933	1840	1737	1642	1545	1448	1350	1251	1152	1052	952	851
1980 FEB 1.0	-1039	-1001	-964	-928	-892	-855	-818	-780	-742	-702	-664	-616	-574	-529	-482	-433	-382	-328	-271	-211	-147
JD 2444260.5	2749	2653	2557	2461	2365	2270	2175	2079	1984	1890	1780	1694	1598	1501	1404	1306	1207	1108	1008	908	807
1980 JAN 22.0	-1034	-997	-961	-925	-889	-853	-816	-779	-740	-701	-650	-615	-572	-527	-480	-431	-379	-325	-268	-207	-141
JD 2444250.5	2705	2609	2513	2417	2321	2226	2131	2036	1941	1848	1745	1651	1554	1457	1360	1262	1163	1064	964	864	0
1980 JAN 12.0	-1029	-993	-958	-922	-887	-851	-814	-776	-738	-699	-653	-612	-569	-523	-476	-426	-374	-319	-261	-199	0
JD 2444240.5	2661	2564	2468	2372	2277	2182	2086	1991	1897	1782	1702	1607	1510	1413	1316	1218	1119	1020	920	0	0
1980 JAN 2.0	-1024	-989	-954	-919	-884	-847	-810	-773	-734	-680	-650	-608	-564	-518	-470	-420	-367	-311	-252	0	0
JD 2444230.5	2616	2520	2424	2328	2232	2137	2042	1947	1854	1751	1658	1562	1466	1369	1271	1173	1074	975	0	0	0
1979 DEC 23.0	-1020	-985	-951	-915	-880	-844	-806	-768	-730	-685	-645	-602	-558	-511	-463	-412	-358	-300	0	0	0
JD 2444220.5	2571	2475	2379	2283	2188	2092	1997	1903	1819	1708	1613	1517	1421	1324	1226	1128	1029	0	0	0	0
1979 DEC 13.0	-1015	-981	-946	-911	-875	-839	-801	-763	-731	-680	-639	-595	-550	-503	-453	-401	-346	0	0	0	0
JD 2444210.5	2526	2430	2334	2238	2142	2047	1952	1858	1757	1664	1568	1472	1376	1279	1181	1083	0	0	0	0	0
1979 DEC 3.0	-1011	-977	-942	-906	-870	-833	-795	-757	-713	-673	-631	-587	-541	-493	-442	-388	0	0	0	0	0
JD 2444200.5	2480	2384	2288	2192	2097	2001	1907	1819	17[illegible]3	1618	1523	1427	1330	1233	1135	0	0	0	0	0	0
1979 NOV 23.0	-1006	-971	-936	-901	-864	-827	-789	-754	-706	-665	-622	-577	-530	-480	-428	0	0	0	0	0	0
(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)

JD2444000.5	JD2444040.5	JD2444080.5	JD2444120.5	JD2444160.5
1979 MAY 7.0	1979 JUN 16.0	1979 JUL 26.0	1979 SEP 4.0	1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

M16
E09

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

	(FLT T) (320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)
JD 2444320.5	192	176	167	164	165	171	183	202	233	285	381	599	1495	2475	708	416	301	240	205	184	171
1980 MAR 22.0	503	462	432	410	394	384	378	376	376	380	387	396	408	421	439	460	483	509	538	569	603
JD 2444310.5	190	178	171	170	174	182	198	223	263	333	472	851	4376	1213	557	367	280	231	202	184	174
1980 MAR 12.0	489	454	429	411	399	392	389	389	393	400	410	424	442	459	483	511	542	578	619	664	714
JD 2444300.5	189	179	175	176	182	194	214	246	299	395	607	1394	3403	816	465	331	263	223	199	184	177
1980 MAR 2.0	478	449	428	414	405	401	401	405	413	424	438	456	476	504	536	572	615	664	721	786	860
JD 2444290.5	188	181	179	182	191	207	232	273	343	479	833	3352	1447	622	402	303	248	216	196	184	179
1980 FEB 21.0	471	446	429	419	414	413	417	424	436	451	471	496	522	558	599	648	705	773	853	946	1055
JD 2444280.5	187	183	183	189	200	220	252	305	399	602	1293	4760	919	506	355	280	236	209	193	185	182
1980 FEB 11.0	465	446	433	426	425	428	435	447	462	483	509	537	576	622	676	741	819	912	1023	1159	1324
JD 2444270.5	187	184	187	195	211	236	276	344	475	803	2720	1698	677	428	319	260	225	203	191	185	185
1980 FEB 1.0	463	448	439	436	438	445	457	473	494	521	554	592	641	700	771	858	964	1093	1253	1453	1709
JD 2444260.5	186	186	191	202	222	253	304	395	586	1194	6650	1011	537	372	290	244	215	198	188	185	187
1980 JAN 22.0	463	452	448	449	455	466	482	503	531	565	603	657	720	796	890	1007	1152	1335	1569	1874	2286
JD 2444250.5	185	187	195	210	234	273	339	463	762	2290	1955	718	445	328	266	229	206	193	186	185	0
1980 JAN 12.0	465	459	459	464	474	490	512	539	574	618	669	735	816	916	1041	1200	1404	1669	2021	2508	0
JD 2444240.5	184	189	200	218	248	297	383	560	1097	8842	1083	554	379	294	245	216	198	188	184	0	0
1980 JAN 2.0	471	469	472	482	497	519	546	582	626	675	746	830	935	1068	1238	1459	1751	2148	2704	0	0
JD 2444230.5	183	190	204	227	264	326	442	715	1973	2190	739	449	329	265	227	204	190	183	0	0	0
1979 DEC 23.0	479	481	489	504	525	552	587	632	687	754	841	949	1087	1266	1501	1816	2251	2871	0	0	0
JD 2444220.5	182	192	210	238	284	364	527	1001	7239	1120	555	375	289	240	211	193	182	0	0	0	0
1979 DEC 13.0	489	496	510	530	557	592	636	691	762	847	958	1099	1284	1530	1863	2330	3007	0	0	0	0
JD 2444210.5	181	194	215	250	307	414	660	1724	2356	735	439	319	256	219	196	182	0	0	0	0	0
1979 DEC 3.0	503	516	535	561	595	639	694	763	850	961	1105	1294	1547	1895	2386	3110	0	0	0	0	0
JD 2444200.5	180	196	222	264	338	485	906	5897	1111	536	359	275	228	200	182	0	0	0	0	0	0
1979 NOV 23.0	521	539	564	597	640	694	763	851	961	1106	1296	1554	1910	2420	3181	0	0	0	0	0	0

	(FLT T) (200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E09

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)
JD 2444320.5	564	617	660	696	726	752	775	795	813	830	846	861	875	892	906	920	933	947	960	971	980
1980 MAR 22.0	1703	1677	1664	1663	1671	1689	1715	1750	1793	1847	1911	1989	2082	2190	2323	2482	2674	2907	3190	3536	3957
JD 2444310.5	579	627	666	698	725	749	770	789	806	822	838	852	864	883	897	911	926	940	954	967	977
1980 MAR 12.0	1686	1669	1664	1670	1687	1713	1748	1793	1849	1918	2002	2105	2232	2381	2572	2811	3117	3515	4048	4784	5853
JD 2444300.5	591	634	669	698	723	745	765	782	799	814	829	843	860	873	887	902	918	933	948	962	974
1980 MAR 2.0	1674	1666	1669	1683	1708	1743	1789	1848	1920	2009	2119	2257	2425	2647	2933	3317	3848	4625	5848	8024	9999
JD 2444290.5	600	639	670	697	720	740	758	775	790	805	819	831	849	863	878	893	909	926	942	957	971
1980 FEB 21.0	1667	1667	1679	1702	1736	1782	1841	1916	2009	2126	2273	2463	2706	3037	3499	4178	5262	7230	9999	9999	9999
JD 2444280.5	607	642	670	695	716	734	751	766	781	795	808	827	838	852	868	884	901	918	936	953	969
1980 FEB 11.0	-1664	-1673	-1694	-1727	-1772	-1831	-1907	-2003	-2124	-2279	-2481	-2744	-3118	-3655	-4489	-5942	-9044	-9999	-9999	-9999	-9999
JD 2444270.5	612	643	669	691	710	727	743	757	771	784	796	813	826	841	857	874	892	911	931	950	967
1980 FEB 1.0	-1667	-1685	-1715	-1759	-1818	-1894	-1990	-2114	-2274	-2486	-2773	-3174	-3779	-4767	-6638	-9999	-9999	-9999	-9999	-9999	-9999
JD 2444260.5	615	643	666	686	704	719	734	747	760	772	792	801	815	830	847	865	884	905	927	948	966
1980 JAN 22.0	-1675	-1703	-1745	-1802	-1876	-1973	-2098	-2261	-2478	-2777	-3200	-3866	-4994	-7310	-9999	-9999	-9999	-9999	-9999	-9999	-9999
JD 2444250.5	617	641	662	680	696	710	724	736	748	759	776	788	803	818	836	856	877	900	924	947	0
1980 JAN 12.0	-1689	-1728	-1783	-1856	-1951	-2075	-2239	-2459	-2765	-3213	-3912	-5157	-7905	-9999	-9999	-9999	-9999	-9999	-9999	-9999	0
JD 2444240.5	616	638	657	673	687	701	713	724	736	758	762	775	790	807	826	847	871	896	923	0	0
1980 JAN 2.0	-1710	-1762	-1832	-1925	-2047	-2209	-2429	-2737	-3193	-3911	-5248	-8367	-9999	-9999	-9999	-9999	-9999	-9999	-9999	0	0
JD 2444230.5	614	634	650	665	678	690	701	712	722	737	749	762	778	796	817	840	867	895	0	0	0
1979 DEC 23.0	-1740	-1807	-1896	-2015	-2174	-2390	-2696	-3152	-389.	-5263	-8647	-9999	-9999	-9999	-9999	-9999	-9999	-9999	0	0	0
JD 2444220.5	611	628	643	656	667	678	689	699	703	722	735	749	766	786	809	835	865	0	0	0	0
1979 DEC 13.0	-1780	-1865	-1979	-2133	-2344	-2643	-3092	-3825	-5215	-8718	-9999	-9999	-9999	-9999	-9999	-9999	-9999	0	0	0	0
JD 2444210.5	606	621	634	645	656	666	675	684	698	708	721	736	755	776	802	832	0	0	0	0	0
1979 DEC 3.0	-1832	-1941	-2089	-2292	-2582	-3017	-3731	-5090	-8582	-9999	-9999	-9999	-9999	-9999	-9999	-9999	0	0	0	0	0
JD 2444200.5	599	613	624	634	644	652	661	666	682	693	707	724	744	769	799	0	0	0	0	0	0
1979 NOV 23.0	-1901	-2042	-2236	-2513	-2930	-3616	-4918	-8277	-9999	-9999	-9999	-9999	-9999	-9999	-9999	0	0	0	0	0	0
(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E09

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)
JD 2444320.5	332	311	294	279	265	252	239	227	215	204	193	181	170	159	148	137	127	116	106	96	87
1980 MAR 22.0	301	292	282	272	262	252	242	231	221	211	201	191	181	170	160	150	140	130	120	110	101
JD 2444310.5	324	305	289	274	260	247	235	223	211	199	188	176	166	154	143	132	121	111	100	90	80
1980 MAR 12.0	295	285	275	265	255	245	235	225	214	204	194	184	174	163	153	143	133	122	112	102	93
JD 2444300.5	317	299	284	269	256	243	230	218	206	194	183	172	159	148	137	126	115	104	94	84	74
1980 MAR 2.0	288	278	268	258	248	238	228	218	207	197	187	177	166	156	145	135	125	115	105	95	85
JD 2444290.5	311	294	279	264	251	238	226	214	202	190	178	167	154	143	131	120	109	98	88	77	67
1980 FEB 21.0	282	272	262	252	241	231	221	211	200	190	180	169	159	148	138	127	117	107	97	87	77
JD 2444280.5	305	289	274	260	246	234	221	209	197	185	173	160	149	137	125	114	103	92	81	70	61
1980 FEB 11.0	275	265	255	245	234	224	214	203	193	183	172	161	151	141	130	120	109	99	88	78	69
JD 2444270.5	299	284	269	255	242	229	216	204	192	180	168	155	143	131	119	107	96	85	74	63	53
1980 FEB 1.0	269	258	248	238	227	217	207	196	186	175	165	154	143	133	122	111	101	90	80	70	60
JD 2444260.5	294	279	264	250	237	224	212	199	187	174	160	149	137	125	113	101	89	77	66	56	46
1980 JAN 22.0	262	251	241	231	220	210	199	189	178	168	156	146	135	125	114	103	93	82	72	62	52
JD 2444250.5	289	274	259	246	232	220	207	194	181	169	156	143	131	118	106	93	81	70	59	48	0
1980 JAN 12.0	255	245	234	224	213	203	192	181	171	160	149	138	127	117	106	95	84	73	63	53	0
JD 2444240.5	284	269	255	241	228	215	202	189	176	160	150	137	124	111	98	86	73	62	50	0	0
1980 JAN 2.0	248	237	227	216	206	195	185	174	163	151	141	130	119	108	97	86	75	65	54	0	0
JD 2444230.5	279	264	250	236	223	210	196	183	170	156	143	130	117	103	90	77	65	53	0	0	0
1979 DEC 23.0	241	230	220	209	198	188	177	166	155	144	133	122	111	99	88	77	66	56	0	0	0
JD 2444220.5	274	259	245	231	218	204	191	178	166	150	136	123	109	95	82	69	56	0	0	0	0
1979 DEC 13.0	234	223	212	202	191	180	169	158	148	136	125	113	102	91	79	68	57	0	0	0	0
JD 2444210.5	269	254	240	226	213	199	185	172	157	143	129	115	101	87	73	59	0	0	0	0	0
1979 DEC 3.0	226	216	205	194	183	172	161	150	139	127	116	105	93	81	70	59	0	0	0	0	0
JD 2444200.5	264	249	235	221	207	193	179	166	150	136	121	106	92	77	63	0	0	0	0	0	0
1979 NOV 23.0	219	208	197	186	175	164	153	142	130	119	107	95	84	72	60	0	0	0	0	0	0

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E09

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)
JD 2444320.5 1980 MAR 22.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444310.5 1980 MAR 12.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444300.5 1980 MAR 2.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444290.5 1980 FEB 21.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444280.5 1980 FEB 11.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444270.5 1980 FEB 1.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444260.5 1980 JAN 22.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444250.5 1980 JAN 12.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0
JD 2444240.5 1980 JAN 2.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0
JD 2444230.5 1979 DEC 23.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0
JD 2444220.5 1979 DEC 13.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0
JD 2444210.5 1979 DEC 3.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0
JD 2444200.5 1979 NOV 23.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

M16
E09

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)
JD 2444320.5	1168	1047	958	891	840	801	769	745	726	711	703	712	878	1185	693	649	628	613	601	592	589
1980 MAR 22.0	458	372	326	310	317	341	378	423	474	531	594	669	851	1067	848	896	958	1022	1088	1154	1220
JD 2444310.5	1129	1026	950	893	849	816	791	771	757	749	749	789	1990	847	730	706	694	685	678	674	678
1980 MAR 12.0	419	353	323	321	340	374	419	472	531	596	669	770	1617	930	945	1013	1088	1166	1246	1329	1414
JD 2444300.5	1099	1012	947	899	863	836	817	803	795	794	809	947	1621	833	791	781	777	777	779	785	801
1980 MAR 2.0	390	343	329	340	370	414	468	529	596	671	758	925	1386	998	1063	1147	1238	1333	1432	1536	1646
JD 2444290.5	1078	1004	949	910	881	861	848	841	840	849	893	1640	1022	883	871	874	883	894	910	933	969
1980 FEB 21.0	371	342	343	367	408	462	524	594	670	756	866	1416	1095	1111	1201	1303	1412	1528	1651	1783	1927
JD 2444280.5	1064	1002	958	926	905	892	886	886	894	918	1037	2256	996	964	973	992	1015	1044	1079	1129	1202
1980 FEB 11.0	362	350	366	402	454	517	589	668	755	855	1016	1835	1165	1249	1361	1484	1617	1759	1912	2082	2275
JD 2444270.5	1056	1006	971	949	935	930	931	940	960	1009	1508	1223	1063	1072	1100	1138	1183	1236	1303	1394	1525
1980 FEB 1.0	363	368	398	446	509	581	662	752	851	972	1368	1279	1295	1413	1548	1696	1858	2033	2230	2452	2715
JD 2444260.5	1055	1016	991	977	972	974	985	1004	1040	1149	3108	1184	1170	1207	1259	1320	1394	1484	1599	1755	1984
1980 JAN 22.0	374	395	439	499	572	655	747	848	962	1125	2432	1350	1459	1605	1768	1947	2145	2368	2622	2921	3292
JD 2444250.5	1061	1033	1017	1012	1016	1028	1049	1081	1141	1499	1448	1272	1310	1375	1455	1549	1665	1808	1995	2261	0
1980 JAN 12.0	396	432	489	561	645	739	842	957	1093	1408	1483	1503	1654	1831	2027	2246	2495	2780	3118	3537	0
JD 2444240.5	1074	1056	1050	1054	1068	1091	1125	1174	1284	4012	1396	1411	1486	1583	1700	1841	2015	2239	2545	0	0
1980 JAN 2.0	428	480	549	633	728	834	951	1083	1254	3078	1556	1698	1885	2098	2338	2611	2928	3305	3771	0	0
JD 2444230.5	1094	1087	1091	1106	1131	1167	1215	1289	1571	1691	1512	1592	1704	1843	2010	2216	2478	2829	0	0	0
1979 DEC 23.0	472	538	620	716	824	944	1076	1229	1508	1706	1738	1932	2159	2419	2716	3062	3477	3992	0	0	0
JD 2444220.5	1122	1126	1141	1168	1206	1256	1324	1441	3518	1634	1691	1817	1977	2170	2407	2709	3108	0	0	0	0
1979 DEC 13.0	527	607	702	811	933	1068	1219	1406	2801	1788	1972	2211	2489	2809	3184	3637	4199	0	0	0	0
JD 2444210.5	1158	1174	1202	1242	1294	1363	1456	1701	1943	1790	1922	2100	2319	2588	2928	3376	0	0	0	0	0
1979 DEC 3.0	593	687	797	920	1058	1211	1386	1654	1946	2009	2255	2549	2891	3294	3781	4390	0	0	0	0	0
JD 2444200.5	1204	1232	1274	1329	1400	1490	1625	3150	1904	2019	2214	2456	2756	3134	3630	0	0	0	0	0	0
1979 NOV 23.0	672	781	906	1045	1201	1376	1584	2637	2053	2292	2599	2961	3390	3911	4565	0	0	0	0	0	0

(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E09

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)
JD 2444320.5	1625	1419	1284	1201	1157	1142	1147	1168	1200	1242	1296	1381	1729	2253	1541	1545	1586	1636	1689	1745	1809
1980 MAR 22.0	3012	2915	2819	2723	2628	2532	2437	2342	2246	2151	2055	1959	1864	1761	1666	1568	1469	1370	1270	1170	1069
JD 2444310.5	1548	1379	1273	1213	1189	1190	1210	1243	1288	1345	1418	1559	3607	1777	1675	1719	1782	1851	1924	2003	2092
1980 MAR 12.0	2968	2871	2775	2679	2584	2488	2393	2298	2202	2107	2011	1916	1875	1719	1622	1524	1426	1327	1227	1126	1026
JD 2444300.5	1490	1354	1275	1239	1233	1250	1284	1332	1391	1464	1567	1872	3007	1831	1854	1928	2015	2110	2210	2321	2447
1980 MAR 2.0	2924	2828	2731	2636	2540	2445	2349	2254	2159	2063	1968	1873	1769	1676	1579	1481	1382	1283	1183	1083	982
JD 2444290.5	1449	1345	1292	1277	1290	1323	1372	1435	1511	1605	1758	3056	2117	1994	2072	2178	2295	2422	2561	2716	2896
1980 FEB 21.0	2881	2784	2688	2592	2496	2401	2306	2211	2115	2020	1925	1832	1728	1632	1535	1437	1338	1239	1139	1039	938
JD 2444280.5	1426	1352	1323	1329	1360	1409	1475	1554	1649	1773	2054	4090	2161	2213	2335	2476	2632	2803	2991	3211	3476
1980 FEB 11.0	2837	2740	2644	2548	2453	2357	2262	2167	2072	1976	1882	1775	1685	1589	1491	1393	1295	1196	1096	995	895
JD 2444270.5	1419	1374	1369	1395	1444	1511	1594	1692	1811	1982	2876	2503	2358	2485	2649	2834	3040	3269	3533	3847	4240
1980 FEB 1.0	2793	2697	2600	2505	2409	2314	2219	2123	2028	1933	1840	1737	1642	1545	1448	1350	1251	1152	1052	952	851
JD 2444260.5	1430	1411	1430	1476	1543	1629	1732	1852	2002	2274	5539	2534	2629	2812	3027	3267	3539	3851	4220	4676	5276
1980 JAN 22.0	2749	2653	2557	2461	2365	2270	2175	2079	1984	1890	1780	1694	1598	1501	1404	1306	1207	1108	1008	908	807
JD 2444250.5	1457	1465	1506	1573	1660	1767	1891	2038	2234	2908	2931	2775	2965	3206	3481	3795	4160	4588	5113	5797	0
1980 JAN 12.0	2705	2609	2513	2417	2321	2226	2131	2036	1941	1848	1745	1651	1554	1457	1360	1262	1163	1064	964	864	0
JD 2444240.5	1503	1536	1600	1688	1797	1926	2076	2257	2538	7089	2952	3108	3372	3681	4038	4453	4942	5544	6316	0	0
1980 JAN 2.0	2661	2564	2468	2372	2277	2182	2086	1991	1897	1782	1702	1607	1510	1413	1316	1218	1119	1020	920	0	0
JD 2444230.5	1566	1625	1711	1822	1955	2110	2291	2518	3079	3396	3250	3524	3863	4262	4727	5278	5955	6821	0	0	0
1979 DEC 23.0	2616	2520	2424	2328	2232	2137	2042	1947	1854	1751	1658	1562	1466	1369	1271	1173	1074	975	0	0	0
JD 2444220.5	1648	1732	1844	1979	2139	2324	2543	2847	6319	3422	3664	4029	4466	4979	5591	6345	7307	0	0	0	0
1979 DEC 13.0	2571	2475	2379	2283	2188	2092	1997	1903	1819	1708	1613	1517	1421	1324	1226	1128	1029	0	0	0	0
JD 2444210.5	1751	1861	1999	2162	2352	2574	2842	3355	3868	3799	4178	4649	5209	5883	6710	7766	0	0	0	0	0
1979 DEC 3.0	2526	2430	2334	2238	2142	2047	1952	1858	1757	1664	1568	1472	1376	1279	1181	1083	0	0	0	0	0
JD 2444200.5	1876	2014	2180	2375	2601	2866	3209	5787	3957	4312	4813	5416	6146	7045	8195	0	0	0	0	0	0
1979 NOV 23.0	2480	2384	2288	2192	2097	2001	1907	1819	1713	1618	1523	1427	1330	1233	1135	0	0	0	0	0	0
(FLT T)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

M16
E10

S87 LIBRARY DECK NO.- 10836L304

EPOCH = 2444300.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671750	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.599	DEGREES
MEAN ANOM. AT EPOCH	=	57.344	DEGREES
DATE OF NODAL PASSAGE	=	2444505.379	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444300.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338713	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.405	DEGREES
ARG. OF PERIHELION	=	286.289	DEGREES
MEAN ANOM. AT EPOCH	=	183.118	DEGREES
DATE OF NODAL PASSAGE	=	2444072.523	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.062	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E10

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)
JD 2444320.5	273	278	294	326	380	460	576	0	0	0	0	0	0	0	0	0	0	0	749	672	620
1980 MAR 22.0	494	518	543	571	604	648	710	0	0	0	0	0	0	0	0	0	0	0	1088	978	891
JD 2444310.5	321	329	350	389	452	550	0	0	0	0	0	0	0	0	0	0	0	0	670	596	549	518
1980 MAR 12.0	562	594	628	667	715	781	0	0	0	0	0	0	0	0	0	0	0	0	1007	911	834	769
JD 2444300.5	380	396	425	476	559	0	0	0	0	0	0	0	0	0	0	0	0	607	531	484	455	438
1980 MAR 2.0	643	684	731	787	860	0	0	0	0	0	0	0	0	0	0	0	0	926	842	775	719	670
JD 2444290.5	455	482	528	602	0	0	0	0	0	0	0	0	0	0	0	0	566	483	431	400	383	373
1980 FEB 21.0	739	795	861	945	0	0	0	0	0	0	0	0	0	0	0	0	847	773	715	668	626	588
JD 2444280.5	552	597	669	0	0	0	0	0	0	0	0	0	0	0	557	460	396	357	335	325	321
1980 FEB 11.0	858	935	1031	0	0	0	0	0	0	0	0	0	0	0	772	705	655	615	580	549	519
JD 2444270.5	678	754	0	0	0	0	0	0	0	0	0	0	0	581	467	387	334	302	285	278	278
1980 FEB 1.0	1008	1118	0	0	0	0	0	0	0	0	0	0	0	705	641	596	562	533	507	483	460
JD 2444260.5	850	0	0	0	0	0	0	0	0	0	0	0	635	504	408	338	290	261	246	242	244
1980 JAN 22.0	1204	0	0	0	0	0	0	0	0	0	0	0	650	584	540	509	485	465	445	427	408
JD 2444250.5	0	0	0	0	0	0	0	0	0	0	0	714	567	455	369	305	259	231	216	212	215
1980 JAN 12.0	0	0	0	0	0	0	0	0	0	0	0	612	537	491	460	439	422	407	393	378	364
JD 2444240.5	0	0	0	0	0	0	0	0	0	0	808	647	522	422	343	283	238	209	194	189	193
1980 JAN 2.0	0	0	0	0	0	0	0	0	0	0	595	506	451	417	395	380	368	357	347	336	324
JD 2444230.5	0	0	0	0	0	0	0	0	0	913	739	602	491	400	327	268	225	195	178	172	175
1979 DEC 23.0	0	0	0	0	0	0	0	0	0	604	495	427	384	358	342	331	322	315	307	299	290
JD 2444220.5	0	0	0	0	0	0	0	0	1024	838	690	569	469	385	315	259	216	185	166	159	161
1979 DEC 13.0	0	0	0	0	0	0	0	0	637	506	420	365	330	309	297	289	283	278	272	266	259
JD 2444210.5	0	0	0	0	0	0	0	1138	940	783	653	544	452	374	308	253	210	178	158	149	150
1979 DEC 3.0	0	0	0	0	0	0	0	691	539	435	363	316	286	269	259	253	249	245	242	237	232
JD 2444200.5	0	0	0	0	0	0	1253	1044	878	740	624	525	439	365	302	250	207	175	153	142	143
1979 NOV 23.0	0	0	0	0	0	0	761	590	468	381	319	278	251	235	227	222	219	217	214	211	207
(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E10

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)
JD 2444320.5	118	126	139	153	164	171	173	0	0	0	0	0	0	0	0	0	0	0	-186	-188	-188
1980 MAR 22.0	1728	1702	1661	1613	1566	1530	1507	0	0	0	0	0	0	0	0	0	0	0	3233	3227	3231
JD 2444310.5	101	107	118	132	144	153	0	0	0	0	0	0	0	0	0	0	0	-188	-194	-197	-196
1980 MAR 12.0	1745	1727	1694	1653	1611	1576	0	0	0	0	0	0	0	0	0	0	0	3247	3230	3222	3226
JD 2444300.5	88	93	102	114	126	0	0	0	0	0	0	0	0	0	0	0	0	-182	-192	-200	-204	-205
1980 MAR 2.0	1756	1743	1716	1682	1646	0	0	0	0	0	0	0	0	0	0	0	0	3283	3256	3235	3225	3228
JD 2444290.5	79	82	90	101	0	0	0	0	0	0	0	0	0	0	0	0	-166	-181	-195	-205	-211	-212
1980 FEB 21.0	1759	1750	1729	1701	0	0	0	0	0	0	0	0	0	0	0	0	3341	3307	3275	3248	3235	3235
JD 2444280.5	73	76	82	0	0	0	0	0	0	0	0	0	0	0	0	-142	-159	-178	-195	-208	-216	-220
1980 FEB 11.0	1757	1750	1733	0	0	0	0	0	0	0	0	0	0	0	0	3409	3378	3341	3302	3271	3252	3249
JD 2444270.5	71	73	0	0	0	0	0	0	0	0	0	0	0	-114	-128	-147	-170	-191	-208	-220	-227
1980 FEB 1.0	1749	1743	0	0	0	0	0	0	0	0	0	0	0	3473	3454	3423	3383	3340	3303	3278	3270
JD 2444260.5	72	0	0	0	0	0	0	0	0	0	0	0	-89	-98	-112	-132	-158	-184	-207	-223	-234
1980 JAN 22.0	1734	0	0	0	0	0	0	0	0	0	0	0	3519	3515	3500	3472	3433	3386	3343	3311	3296
JD 2444250.5	0	0	0	0	0	0	0	0	0	0	0	-73	-75	-81	-94	-115	-142	-173	-202	-224	-240
1980 JAN 12.0	0	0	0	0	0	0	0	0	0	0	0	3543	3552	3553	3544	3522	3486	3439	3390	3351	3330
JD 2444240.5	0	0	0	0	0	0	0	0	0	0	-65	-61	-61	-66	-77	-97	-125	-159	-194	-224	-247
1980 JAN 2.0	0	0	0	0	0	0	0	0	0	0	3547	3565	3579	3587	3585	3569	3538	3493	3442	3397	3368
JD 2444230.5	0	0	0	0	0	0	0	0	0	-65	-58	-52	-50	-52	-61	-79	-107	-143	-184	-221	-253
1979 DEC 23.0	0	0	0	0	0	0	0	0	0	3534	3559	3581	1	15	19	11	3587	3547	3497	3448	3413
JD 2444220.5	0	0	0	0	0	0	0	0	-70	-61	-52	-45	-41	-41	-47	-63	-89	-126	-171	-217	-259
1979 DEC 13.0	0	0	0	0	0	0	0	0	3509	3537	3566	3593	17	36	47	47	31	3598	3551	3500	3460
JD 2444210.5	0	0	0	0	0	0	0	-81	-70	-59	-48	-40	-33	-31	-36	-49	-73	-110	-158	-212	-266
1979 DEC 3.0	0	0	0	0	0	0	0	3475	3505	3537	3569	1	29	53	70	76	68	43	2	3553	3511
JD 2444200.5	0	0	0	0	0	0	-94	-83	-70	-58	-46	-36	-28	-24	-26	-37	-59	-95	-146	-207	-274
1979 NOV 23.0	0	0	0	0	0	0	3434	3465	3499	3534	3570	5	37	65	87	99	98	81	47	3	3562
(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E10

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)
JD 2444320.5	-230	-227	-223	-220	-217	-213	-209	0	0	0	0	0	0	0	0	0	0	0	214	221	228
1980 MAR 22.0	2594	2606	2614	2618	2615	2605	2585	0	0	0	0	0	0	0	0	0	0	0	597	619	641
JD 2444310.5	-229	-226	-223	-220	-217	-214	0	0	0	0	0	0	0	0	0	0	0	204	211	218	225
1980 MAR 12.0	2571	2585	2596	2602	2602	2595	0	0	0	0	0	0	0	0	0	0	0	564	580	599	619
JD 2444300.5	-227	-225	-223	-220	-218	0	0	0	0	0	0	0	0	0	0	0	195	201	207	214	222
1980 MAR 2.0	2549	2565	2577	2586	2589	0	0	0	0	0	0	0	0	0	0	0	538	548	562	578	596
JD 2444290.5	-225	-224	-222	-220	0	0	0	0	0	0	0	0	0	0	0	186	191	197	203	211	219
1980 FEB 21.0	2527	2545	2560	2571	0	0	0	0	0	0	0	0	0	0	0	522	524	531	542	556	572
JD 2444280.5	-223	-223	-221	0	0	0	0	0	0	0	0	0	0	0	181	183	187	192	199	207	215
1980 FEB 11.0	2505	2525	2543	0	0	0	0	0	0	0	0	0	0	0	518	510	509	514	523	534	548
JD 2444270.5	-221	-221	0	0	0	0	0	0	0	0	0	0	0	178	177	179	183	188	195	202	212
1980 FEB 1.0	2485	2508	0	0	0	0	0	0	0	0	0	0	0	528	508	498	494	496	503	512	524
JD 2444260.5	-218	0	0	0	0	0	0	0	0	0	0	0	179	175	174	175	178	183	190	198	208
1980 JAN 22.0	2466	0	0	0	0	0	0	0	0	0	0	0	553	522	499	485	479	479	483	490	501
JD 2444250.5	0	0	0	0	0	0	0	0	0	0	0	183	177	173	171	171	174	179	186	194	205
1980 JAN 12.0	0	0	0	0	0	0	0	0	0	0	0	595	552	517	491	474	465	462	463	469	478
JD 2444240.5	0	0	0	0	0	0	0	0	0	0	189	182	175	170	167	167	170	174	181	191	203
1980 JAN 2.0	0	0	0	0	0	0	0	0	0	0	649	600	553	514	484	464	451	445	445	449	455
JD 2444230.5	0	0	0	0	0	0	0	0	0	197	189	181	174	168	164	163	165	170	177	188	202
1979 DEC 23.0	0	0	0	0	0	0	0	0	0	705	659	608	557	514	479	455	439	431	428	429	434
JD 2444220.5	0	0	0	0	0	0	0	0	203	197	189	181	173	166	162	160	162	166	174	185	202
1979 DEC 13.0	0	0	0	0	0	0	0	0	754	720	673	619	565	516	477	449	429	417	412	411	413
JD 2444210.5	0	0	0	0	0	0	0	209	204	197	190	181	172	165	159	157	158	163	171	185	204
1979 DEC 3.0	0	0	0	0	0	0	0	789	771	738	691	634	576	523	479	445	421	406	398	394	394
JD 2444200.5	0	0	0	0	0	0	214	209	204	198	190	182	172	164	158	155	156	161	170	185	210
1979 NOV 23.0	0	0	0	0	0	0	806	805	790	759	712	654	592	534	484	445	417	398	386	380	376

(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E10

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)
JD 2444320.5 1980 MAR 22.0	742	742	742	742	742	742	742	0	0	0	0	0	0	0	0	0	0	0	742	742	742
JD 2444310.5 1980 MAR 12.0	701	701	701	701	701	701	0	0	0	0	0	0	0	0	0	0	0	701	701	701	701
JD 2444300.5 1980 MAR 2.0	680	680	680	680	680	0	0	0	0	0	0	0	0	0	0	0	680	680	680	680	680
JD 2444290.5 1980 FEB 21.0	680	680	680	680	0	0	0	0	0	0	0	0	0	0	0	680	680	680	680	680	680
JD 2444280.5 1980 FEB 11.0	703	703	703	0	0	0	0	0	0	0	0	0	0	0	703	703	703	703	703	703	703
JD 2444270.5 1980 FEB 1.0	746	746	0	0	0	0	0	0	0	0	0	0	0	746	746	746	746	746	746	746	746
JD 2444260.5 1980 JAN 22.0	806	0	0	0	0	0	0	0	0	0	0	0	806	806	806	806	806	806	806	806	806
JD 2444250.5 1980 JAN 12.0	0	0	0	0	0	0	0	0	0	0	0	878	878	878	878	878	878	878	878	878	878
JD 2444240.5 1980 JAN 2.0	0	0	0	0	0	0	0	0	0	0	958	958	958	958	958	958	958	958	958	958	958
JD 2444230.5 1979 DEC 23.0	0	0	0	0	0	0	0	0	0	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044
JD 2444220.5 1979 DEC 13.0	0	0	0	0	0	0	0	0	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133
JD 2444210.5 1979 DEC 3.0	0	0	0	0	0	0	0	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222
JD 2444200.5 1979 NOV 23.0	0	0	0	0	0	0	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311

(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16 E10

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

	(FLT T)(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)
JD 2444320.5	198	198	198	198	198	198	198	0	0	0	0	0	0	0	0	0	0	0	198	198	198
1980 MAR 22.0	1457	1457	1457	1457	1457	1457	1457	0	0	0	0	0	0	0	0	0	0	0	1457	1457	1457
JD 2444310.5	129	129	129	129	129	129	0	0	0	0	0	0	0	0	0	0	0	129	129	129	129
1980 MAR 12.0	1580	1580	1580	1580	1580	1580	0	0	0	0	0	0	0	0	0	0	0	1580	1580	1580	1580
JD 2444300.5	54	54	54	54	54	0	0	0	0	0	0	0	0	0	0	0	54	54	54	54	54
1980 MAR 2.0	1709	1709	1709	1709	1709	0	0	0	0	0	0	0	0	0	0	0	1709	1709	1709	1709	1709
JD 2444290.5	44	44	44	44	0	0	0	0	0	0	0	0	0	0	0	44	44	44	44	44	44
1980 FEB 21.0	1726	1726	1726	1726	0	0	0	0	0	0	0	0	0	0	0	1726	1726	1726	1726	1726	1726
JD 2444280.5	117	117	117	0	0	0	0	0	0	0	0	0	0	0	117	117	117	117	117	117	117
1980 FEB 11.0	1599	1599	1599	0	0	0	0	0	0	0	0	0	0	0	1599	1599	1599	1599	1599	1599	1599
JD 2444270.5	187	187	0	0	0	0	0	0	0	0	0	0	0	187	187	187	187	187	187	187	187
1980 FEB 1.0	1473	1473	0	0	0	0	0	0	0	0	0	0	0	1473	1473	1473	1473	1473	1473	1473	1473
JD 2444260.5	244	0	0	0	0	0	0	0	0	0	0	0	244	244	244	244	244	244	244	244	244
1980 JAN 22.0	1359	0	0	0	0	0	0	0	0	0	0	0	1359	1359	1359	1359	1359	1359	1359	1359	1359
JD 2444250.5	0	0	0	0	0	0	0	0	0	0	0	289	289	289	289	289	289	289	289	289	289
1980 JAN 12.0	0	0	0	0	0	0	0	0	0	0	0	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256
JD 2444240.5	0	0	0	0	0	0	0	0	0	0	322	322	322	322	322	322	322	322	322	322	322
1980 JAN 2.0	0	0	0	0	0	0	0	0	0	0	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166
JD 2444230.5	0	0	0	0	0	0	0	0	0	345	345	345	345	345	345	345	345	345	345	345	345
1979 DEC 23.0	0	0	0	0	0	0	0	0	0	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085
JD 2444220.5	0	0	0	0	0	0	0	0	361	361	361	361	361	361	361	361	361	361	361	361	361
1979 DEC 13.0	0	0	0	0	0	0	0	0	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012
JD 2444210.5	0	0	0	0	0	0	0	370	370	370	370	370	370	370	370	370	370	370	370	370	370
1979 DEC 3.0	0	0	0	0	0	0	0	947	947	947	947	947	947	947	947	947	947	947	947	947	947
JD 2444200.5	0	0	0	0	0	0	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375
1979 NOV 23.0	0	0	0	0	0	0	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887
(FLT T)(	0)(	10)(	20)(	30)(	40)(	50)(	60)(	70)(	80)(	90)(	100)(	110)(	120)(	130)(	140)(	150)(	160)(	170)(	180)(	190)(	200)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E10

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)
JD 2444320.5	1069	968	867	765	663	561	459	0	0	0	0	0	0	0	0	0	0	0	731	827	922
1980 MAR 22.0	-116	-41	40	132	235	352	486	0	0	0	0	0	0	0	0	0	0	0	-657	-687	-723
JD 2444310.5	1026	924	823	721	619	518	0	0	0	0	0	0	0	0	0	0	0	678	774	870	966
1980 MAR 12.0	-129	-57	21	108	205	317	0	0	0	0	0	0	0	0	0	0	0	-672	-698	-729	-765
JD 2444300.5	982	881	779	678	576	0	0	0	0	0	0	0	0	0	0	0	625	722	818	914	1010
1980 MAR 2.0	-139	-69	7	92	185	0	0	0	0	0	0	0	0	0	0	0	-699	-718	-743	-774	-810
JD 2444290.5	938	837	736	634	0	0	0	0	0	0	0	0	0	0	0	571	669	765	862	958	1053
1980 FEB 21.0	-145	-76	-1	81	0	0	0	0	0	0	0	0	0	0	0	-744	-752	-769	-793	-823	-858
JD 2444280.5	895	793	692	0	0	0	0	0	0	0	0	0	0	0	517	615	712	809	905	1001	1097
1980 FEB 11.0	-148	-79	-4	0	0	0	0	0	0	0	0	0	0	0	-813	-806	-810	-825	-847	-876	-910
JD 2444270.5	851	750	0	0	0	0	0	0	0	0	0	0	0	463	561	659	756	853	949	1045	1141
1980 FEB 1.0	-147	-77	0	0	0	0	0	0	0	0	0	0	0	-920	-890	-876	-875	-886	-906	-932	-965
JD 2444260.5	807	0	0	0	0	0	0	0	0	0	0	0	408	507	605	703	800	897	993	1089	1185
1980 JAN 22.0	-141	0	0	0	0	0	0	0	0	0	0	0	-1070	-1012	-974	-953	-946	-953	-969	-992	-1022
JD 2444250.5	0	0	0	0	0	0	0	0	0	0	0	352	452	551	649	747	844	941	1037	1133	1229
1980 JAN 12.0	0	0	0	0	0	0	0	0	0	0	0	-1249	-1173	-1110	-1064	-1035	-1023	-1023	-1035	-1055	-1083
JD 2444240.5	0	0	0	0	0	0	0	0	0	0	297	397	496	595	693	791	888	985	1081	1177	1273
1980 JAN 2.0	0	0	0	0	0	0	0	0	0	0	-1419	-1344	-1272	-1207	-1156	-1121	-1103	-1098	-1105	-1122	-1146
JD 2444230.5	0	0	0	0	0	0	0	0	0	241	341	441	540	639	738	835	933	1029	1126	1222	1317
1979 DEC 23.0	0	0	0	0	0	0	0	0	0	-1549	-1490	-1428	-1363	-1301	-1248	-1209	-1185	-1175	-1178	-1190	-1211
JD 2444220.5	0	0	0	0	0	0	0	0	185	286	386	486	585	684	783	880	978	1074	1171	1267	1362
1979 DEC 13.0	0	0	0	0	0	0	0	0	-1641	-1597	-1552	-1502	-1446	-1389	-1337	-1296	-1268	-1254	-1252	-1260	-1277
JD 2444210.5	0	0	0	0	0	0	0	129	230	331	431	531	631	729	828	926	1023	1120	1216	1312	1408
1979 DEC 3.0	0	0	0	0	0	0	0	-1705	-1670	-1639	-1606	-1566	-1519	-1469	-1421	-1380	-1350	-1332	-1326	-1331	-1344
JD 2444200.5	0	0	0	0	0	0	74	175	276	376	477	577	676	775	874	971	1069	1165	1262	1358	1453
1979 NOV 23.0	0	0	0	0	0	0	-1751	-1719	-1698	-1678	-1654	-1623	-1585	-1542	-1499	-1460	-1430	-1409	-1401	-1402	-1412
(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E10

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

	(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)
JD 2444320.5		171	165	164	169	179	197	228	0	0	0	0	0	0	0	0	0	0	0	171	165	164
1980 MAR 22.0		603	639	677	716	759	807	867	0	0	0	0	0	0	0	0	0	0	0	2023	1688	1434
JD 2444310.5		174	170	172	179	193	216	0	0	0	0	0	0	0	0	0	0	0	184	174	170	171
1980 MAR 12.0		714	769	828	894	968	1054	0	0	0	0	0	0	0	0	0	0	0	1779	1515	1309	1144
JD 2444300.5		177	175	179	189	207	0	0	0	0	0	0	0	0	0	0	0	197	184	177	175	178
1980 MAR 2.0		860	943	1038	1149	1282	0	0	0	0	0	0	0	0	0	0	0	1531	1332	1174	1043	933
JD 2444290.5		179	180	187	200	0	0	0	0	0	0	0	0	0	0	0	213	195	184	179	180	186
1980 FEB 21.0		1055	1184	1340	1533	0	0	0	0	0	0	0	0	0	0	0	1288	1148	1032	935	850	775
JD 2444280.5		182	185	195	0	0	0	0	0	0	0	0	0	0	0	232	207	192	184	182	185	193
1980 FEB 11.0		1324	1528	1791	0	0	0	0	0	0	0	0	0	0	0	1064	971	893	824	762	705	654
JD 2444270.5		185	191	0	0	0	0	0	0	0	0	0	0	0	255	222	202	190	185	185	190	202
1980 FEB 1.0		1709	2044	0	0	0	0	0	0	0	0	0	0	0	877	812	760	715	672	632	595	559
JD 2444260.5		187	0	0	0	0	0	0	0	0	0	0	0	283	239	213	196	188	185	187	195	210
1980 JAN 22.0		2286	0	0	0	0	0	0	0	0	0	0	0	747	689	647	615	587	560	535	509	485
JD 2444250.5		0	0	0	0	0	0	0	0	0	0	0	320	261	225	204	192	186	185	190	201	220
1980 JAN 12.0		0	0	0	0	0	0	0	0	0	0	0	694	619	569	537	513	494	477	459	443	426
JD 2444240.5		0	0	0	0	0	0	0	0	0	0	371	288	241	213	196	187	183	185	193	207	231
1980 JAN 2.0		0	0	0	0	0	0	0	0	0	0	714	613	540	492	461	441	426	413	402	390	379
JD 2444230.5		0	0	0	0	0	0	0	0	0	444	323	260	224	202	189	182	181	186	196	214	243
1979 DEC 23.0		0	0	0	0	0	0	0	0	0	779	659	562	490	441	410	389	376	365	357	349	341
JD 2444220.5		0	0	0	0	0	0	0	0	560	371	285	237	208	191	181	178	179	186	199	221	257
1979 DEC 13.0		0	0	0	0	0	0	0	0	856	734	621	528	458	408	374	353	339	329	322	316	311
JD 2444210.5		0	0	0	0	0	0	0	775	443	317	253	216	194	181	174	173	177	186	203	230	273
1979 DEC 3.0		0	0	0	0	0	0	0	926	815	698	592	504	435	385	350	327	312	302	295	290	286
JD 2444200.5		0	0	0	0	0	0	1308	558	361	274	226	198	181	171	167	168	174	187	207	239	294
1979 NOV 23.0		0	0	0	0	0	0	975	889	779	669	570	486	419	369	333	308	292	281	274	270	267
	(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E10

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

	(FLT T)(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)
JD 2444320.5	980	985	-983	-972	-947	-902	-828	0	0	0	0	0	0	0	0	0	0	0	1007	996	980
1980 MAR 22.0	-3957	-4473	-5104	-5889	-6914	-8458	-9999	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999
JD 2444310.5	977	984	-983	-974	-951	-907	0	0	0	0	0	0	0	0	0	0	0	0	1010	1007	997	983
1980 MAR 12.0	-5853	-7520	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999
JD 2444300.5	974	982	-983	-976	-954	0	0	0	0	0	0	0	0	0	0	0	0	0	-1001	1010	1008	999	986
1980 MAR 2.0	-9999	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-9999
JD 2444290.5	971	981	984	-977	0	0	0	0	0	0	0	0	0	0	0	0	0	-978	-1001	-1009	1009	1001	990
1980 FEB 21.0	-9999	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-9999	-7797
JD 2444280.5	969	980	984	0	0	0	0	0	0	0	0	0	0	0	0	-933	-977	-1000	-1009	1010	1004	994	
1980 FEB 11.0	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-7464	-5801	-4744	
JD 2444270.5	967	980	0	0	0	0	0	0	0	0	0	0	0	0	-857	-929	-973	-997	-1008	1011	1007	998	
1980 FEB 1.0	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	0	-9999	-8981	-7151	-5998	-5151	-4488	-3959	-3532	
JD 2444260.5	966	0	0	0	0	0	0	0	0	0	0	0	0	-740	-849	-922	-968	-994	-1007	1012	1009	1002	
1980 JAN 22.0	-9999	0	0	0	0	0	0	0	0	0	0	0	0	-5125	-4609	-4311	-4066	-3824	-3578	-3335	-3103	-2889	
JD 2444250.5	0	0	0	0	0	0	0	0	0	0	0	0	-587	-731	-838	-913	-961	-990	-1006	1012	1011	1006	
1980 JAN 12.0	0	0	0	0	0	0	0	0	0	0	0	0	-3258	-3108	-3058	-3031	-2991	-2927	-2838	-2732	-2616	-2497	
JD 2444240.5	0	0	0	0	0	0	0	0	0	0	0	-420	-583	-721	-827	-903	-954	-986	-1003	-1011	1013	1009	
1980 JAN 2.0	0	0	0	0	0	0	0	0	0	0	0	-2527	-2431	-2415	-2431	-2452	-2460	-2450	-2418	-2369	-2307	-2238	
JD 2444230.5	0	0	0	0	0	0	0	0	0	0	-271	-430	-581	-711	-815	-893	-946	-980	-1000	-1010	1014	1011	
1979 DEC 23.0	0	0	0	0	0	0	0	0	0	0	-2185	-2095	-2072	-2081	-2106	-2133	-2154	-2161	-2153	-2131	-2097	-2056	
JD 2444220.5	0	0	0	0	0	0	0	0	0	-154	-294	-440	-580	-704	-805	-883	-938	-974	-997	-1009	1014	1013	
1979 DEC 13.0	0	0	0	0	0	0	0	0	0	-2006	-1916	-1884	-1880	-1893	-1915	-1940	-1961	-1974	-1976	-1967	-1949	-1924	
JD 2444210.5	0	0	0	0	0	0	0	-72	-184	-315	-451	-582	-699	-797	-874	-930	-968	-993	-1007	-1013	1014		
1979 DEC 3.0	0	0	0	0	0	0	0	-1903	-1813	-1777	-1764	-1766	-1778	-1795	-1815	-1833	-1846	-1852	-1850	-1841	-1826		
JD 2444200.5	0	0	0	0	0	0	-27	-102	-212	-335	-463	-585	-696	-791	-866	-923	-963	-989	-1005	-1012	1015		
1979 NOV 23.0	0	0	0	0	0	0	-1841	-1750	-1711	-1696	-1691	-1695	-1704	-1716	-1731	-1745	-1757	-1764	-1765	-1761	-1752		
(FLT T)(	0)(	10)(	20)(	30)(	40)(	50)(	60)(	70)(	80)(	90)(100)(110)(120)(130)(140)(150)(160)(170)(180)(190)(200)													

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E10

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)
JD 2444320.5	87	77	68	60	52	45	37	0	0	0	0	0	0	0	0	0	0	0	42	51	61
1980 MAR 22.0	101	91	82	73	64	55	47	0	0	0	0	0	0	0	0	0	0	0	50	59	69
JD 2444310.5	80	71	62	54	46	38	0	0	0	0	0	0	0	0	0	0	0	41	49	58	68
1980 MAR 12.0	93	83	74	65	56	47	0	0	0	0	0	0	0	0	0	0	0	49	58	67	77
JD 2444300.5	74	65	56	47	40	0	0	0	0	0	0	0	0	0	0	0	40	48	56	65	74
1980 MAR 2.0	85	75	66	57	48	0	0	0	0	0	0	0	0	0	0	0	48	57	66	75	85
JD 2444290.5	67	58	49	41	0	0	0	0	0	0	0	0	0	0	0	39	46	54	63	71	81
1980 FEB 21.0	77	67	58	49	0	0	0	0	0	0	0	0	0	0	0	48	56	65	74	83	93
JD 2444280.5	61	51	42	0	0	0	0	0	0	0	0	0	0	0	38	45	53	60	69	78	87
1980 FEB 11.0	69	59	50	0	0	0	0	0	0	0	0	0	0	0	47	55	64	73	82	91	101
JD 2444270.5	53	44	0	0	0	0	0	0	0	0	0	0	0	37	44	51	59	67	75	84	93
1980 FEB 1.0	60	51	0	0	0	0	0	0	0	0	0	0	0	47	55	63	72	81	90	99	108
JD 2444260.5	46	0	0	0	0	0	0	0	0	0	0	0	36	43	50	57	65	73	81	90	99
1980 JAN 22.0	52	0	0	0	0	0	0	0	0	0	0	0	46	54	62	71	79	88	97	107	116
JD 2444250.5	0	0	0	0	0	0	0	0	0	0	0	36	42	49	56	63	70	78	87	95	104
1980 JAN 12.0	0	0	0	0	0	0	0	0	0	0	0	46	54	62	70	78	87	96	105	114	123
JD 2444240.5	0	0	0	0	0	0	0	0	0	0	35	41	48	54	61	68	76	84	92	101	110
1980 JAN 2.0	0	0	0	0	0	0	0	0	0	0	46	53	61	69	77	86	94	103	112	121	131
JD 2444230.5	0	0	0	0	0	0	0	0	0	35	41	47	53	60	67	74	81	89	98	106	115
1979 DEC 23.0	0	0	0	0	0	0	0	0	0	45	53	61	68	76	85	93	102	111	120	129	138
JD 2444220.5	0	0	0	0	0	0	0	0	35	41	46	52	59	65	72	79	87	95	103	111	120
1979 DEC 13.0	0	0	0	0	0	0	0	0	45	53	60	68	76	84	92	100	109	118	127	136	145
JD 2444210.5	0	0	0	0	0	0	0	35	40	46	52	58	64	70	77	85	92	100	108	116	125
1979 DEC 3.0	0	0	0	0	0	0	0	45	53	60	67	75	83	91	99	108	116	125	134	143	152
JD 2444200.5	0	0	0	0	0	0	35	40	45	51	57	63	69	76	82	90	97	105	113	121	130
1979 NOV 23.0	0	0	0	0	0	0	45	52	60	67	75	82	90	98	106	115	123	132	141	150	159

(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M16 E10

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)
JD 2444320.5 1980 MAR 22.0	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524
JD 2444310.5 1980 MAR 12.0	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524
JD 2444300.5 1980 MAR 2.0	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524
JD 2444290.5 1980 FEB 21.0	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524
JD 2444280.5 1980 FEB 11.0	772	772	772	0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1492	1471
JD 2444270.5 1980 FEB 1.0	772	772	0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1490	1427	1396
JD 2444260.5 1980 JAN 22.0	772	0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1497	1406	1354	1329
JD 2444250.5 1980 JAN 12.0	0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1433	1351	1304	1282
JD 2444240.5 1980 JAN 2.0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1508	1392	1316	1272	1250
JD 2444230.5 1979 DEC 23.0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1475	1367	1295	1251	1228
JD 2444220.5 1979 DEC 13.0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1453	1351	1281	1237
JD 2444210.5 1979 DEC 3.0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1439	1341	1273	1229
JD 2444200.5 1979 NOV 23.0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1428	1335	1268	1224

(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)
JD 2444200.5 1979 NOV 23.0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1428	1335	1268	1224	1198	1187	1187

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E10

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)
D 2444320.5	589	598	627	689	800	981	1261	0	0	0	0	0	0	0	0	0	0	0	967	763	629
980 MAR 22.0	1220	1288	1359	1439	1534	1660	1843	0	0	0	0	0	0	0	0	0	0	0	2950	2628	2370
D 2444310.5	678	696	737	819	962	1197	0	0	0	0	0	0	0	0	0	0	0	0	759	570	452	375
980 MAR 12.0	1414	1504	1602	1716	1857	2048	0	0	0	0	0	0	0	0	0	0	0	0	2712	2430	2204	2014
D 2444300.5	801	835	900	1018	1220	0	0	0	0	0	0	0	0	0	0	0	0	596	408	295	228	187
980 MAR 2.0	1646	1767	1903	2067	2280	0	0	0	0	0	0	0	0	0	0	0	0	2474	2227	2032	1869	1727
D 2444290.5	969	1032	1141	1327	0	0	0	0	0	0	0	0	0	0	0	0	494	292	171	103	66	46
980 FEB 21.0	1927	2090	2284	2529	0	0	0	0	0	0	0	0	0	0	0	0	2241	2024	1856	1720	1599	1489
D 2444280.5	1202	1316	1501	0	0	0	0	0	0	0	0	0	0	0	0	471	238	95	12	0	0	0
980 FEB 11.0	2275	2501	2784	0	0	0	0	0	0	0	0	0	0	0	0	2023	1828	1683	1566	1466	1375	1289
D 2444270.5	1525	1726	0	0	0	0	0	0	0	0	0	0	0	0	531	254	76	0	0	0	0	0
980 FEB 1.0	2715	3039	0	0	0	0	0	0	0	0	0	0	0	0	1828	1641	1511	1412	1330	1256	1187	1121
D 2444260.5	1984	0	0	0	0	0	0	0	0	0	0	0	0	669	343	120	0	0	0	0	0	0
980 JAN 22.0	3292	0	0	0	0	0	0	0	0	0	0	0	0	1667	1476	1351	1262	1194	1135	1081	1029	977
D 2444250.5	0	0	0	0	0	0	0	0	0	0	0	0	873	496	226	37	0	0	0	0	0	0
980 JAN 12.0	0	0	0	0	0	0	0	0	0	0	0	0	1556	1342	1209	1123	1062	1015	973	933	893	853
D 2444240.5	0	0	0	0	0	0	0	0	0	0	0	1126	700	385	152	0	0	0	0	0	0	0
980 JAN 2.0	0	0	0	0	0	0	0	0	0	0	0	1510	1253	1098	1002	941	899	866	836	808	778	746
D 2444230.5	0	0	0	0	0	0	0	0	0	0	1414	941	583	310	103	0	0	0	0	0	0	0
979 DEC 23.0	0	0	0	0	0	0	0	0	0	0	1534	1222	1028	909	837	793	763	741	721	700	678	654
D 2444220.5	0	0	0	0	0	0	0	0	0	1722	1207	811	501	258	70	0	0	0	0	0	0	0
979 DEC 13.0	0	0	0	0	0	0	0	0	0	1629	1254	1011	856	762	705	672	651	636	623	608	592	574
D 2444210.5	0	0	0	0	0	0	0	0	2043	1488	1057	715	440	220	47	0	0	0	0	0	0	0
979 DEC 3.0	0	0	0	0	0	0	0	0	1786	1347	1051	852	724	645	599	573	558	548	539	530	518	505
D 2444200.5	0	0	0	0	0	0	0	2369	1777	1315	944	640	392	190	29	0	0	0	0	0	0	0
979 NOV 23.0	0	0	0	0	0	0	0	1990	1493	1145	900	732	622	554	514	492	481	474	469	462	455	445
(FLT T)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E10

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

	(FLT T)(120)(110)(100)(90)(80)(70)(60)(50)(40)(30)(20)(10)(0)(10)(20)(30)(40)(50)(60)(70)(80)
JD 2444320.5	1809 1886 1987 2128 2334 2641 3103 0 0 0 0 0 0 0 0 0 0 0 0 3917 3391 2999
1980 MAR 22.0	1069 968 867 765 663 561 459 0 0 0 0 0 0 0 0 0 0 0 0 731 827 922
JD 2444310.5	2092 2200 2340 2535 2819 3245 0 0 0 0 0 0 0 0 0 0 0 0 0 3471 2999 2656 2389
1980 MAR 12.0	1026 924 823 721 619 518 0 0 0 0 0 0 0 0 0 0 0 0 0 678 774 870 966
JD 2444300.5	2447 2602 2803 3085 3500 0 0 0 0 0 0 0 0 0 0 0 0 0 3070 2635 2327 2097 1914
1980 MAR 2.0	982 881 779 678 576 0 0 0 0 0 0 0 0 0 0 0 0 0 625 722 818 914 1010
JD 2444290.5	2896 3123 3425 3855 0 0 0 0 0 0 0 0 0 0 0 0 0 2735 2316 2028 1823 1664 1535
1980 FEB 21.0	938 837 736 634 0 0 0 0 0 0 0 0 0 0 0 0 0 571 669 765 862 958 1053
JD 2444280.5	3476 3817 4285 0 0 0 0 0 0 0 0 0 0 0 0 0 2493 2066 1778 1578 1466 1375 1289
1980 FEB 11.0	895 793 692 0 0 0 0 0 0 0 0 0 0 0 0 0 517 615 712 809 905 1001 1097
JD 2444270.5	4240 4765 0 0 0 0 0 0 0 0 0 0 0 0 0 2358 1896 1587 1412 1330 1256 1187 1121
1980 FEB 1.0	851 750 0 0 0 0 0 0 0 0 0 0 0 0 0 463 561 659 756 853 949 1045 1141
JD 2444260.5	5276 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2336 1818 1471 1262 1194 1135 1081 1029 977
1980 JAN 22.0	807 0 0 0 0 0 0 0 0 0 0 0 0 0 0 408 507 605 703 800 897 993 1089 1185
JD 2444250.5	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2429 1838 1436 1160 1062 1015 973 933 893 853
1980 JAN 12.0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 352 452 551 649 747 844 941 1037 1133 1229
JD 2444240.5	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2636 1953 1482 1154 941 899 866 836 808 778 746
1980 JAN 2.0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 297 397 496 595 693 791 888 985 1081 1177 1273
JD 2444230.5	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2948 2163 1611 1219 941 793 763 741 721 700 678 654
1979 DEC 23.0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 241 341 441 540 639 738 835 933 1029 1126 1222 1317
JD 2444220.5	0 0 0 0 0 0 0 0 0 0 0 0 0 0 3352 2461 1821 1357 1020 776 672 651 636 623 608 592 574
1979 DEC 13.0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 185 286 386 486 585 684 783 880 978 1074 1171 1267 1362
JD 2444210.5	0 0 0 0 0 0 0 0 0 0 0 0 0 3829 2835 2108 1567 1164 865 646 573 558 548 539 530 518 505
1979 DEC 3.0	0 0 0 0 0 0 0 0 0 0 0 0 0 129 230 331 431 531 631 729 828 926 1023 1120 1216 1312 1408
JD 2444200.5	0 0 0 0 0 0 0 0 0 0 0 0 0 4358 3270 2460 1844 1373 1014 744 543 492 481 474 469 462 455 445
1979 NOV 23.0	0 0 0 0 0 0 0 0 0 0 0 0 0 74 175 276 376 477 577 676 775 874 971 1069 1165 1262 1358 1453
	(FLT T)(0)(10)(20)(30)(40)(50)(60)(70)(80)(90)(100)(110)(120)(130)(140)(150)(160)(170)(180)(190)(200)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

M16
E11

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444400.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671739	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.604	DEGREES
MEAN ANOM. AT EPOCH	=	155.904	DEGREES
DATE OF NODAL PASSAGE	=	2444505.375	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444400.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338739	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.407	DEGREES
ARG. OF PERIHELION	=	286.292	DEGREES
MEAN ANOM. AT EPOCH	=	235.520	DEGREES
DATE OF NODAL PASSAGE	=	2444072.520	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.063	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E11

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)
JD 2444320.5	620	583	556	534	516	501	489	480	486	946	491	450	440	436	436	438	444	454	469	490	520
1980 MAR 22.0	891	816	751	692	639	589	543	501	469	704	400	348	312	279	249	222	198	180	170	172	189
JD 2444310.5	518	496	481	468	458	450	444	445	495	702	440	422	418	418	420	426	436	450	469	495	531
1980 MAR 12.0	769	712	660	613	568	526	488	454	448	526	353	313	281	252	225	200	180	167	164	174	199
JD 2444300.5	438	426	419	413	409	406	407	423	744	465	406	399	399	402	408	417	430	447	471	502	545
1980 MAR 2.0	670	626	584	545	507	472	440	416	569	375	316	283	254	227	203	182	166	158	162	179	212
JD 2444290.5	373	369	367	367	368	370	380	435	862	401	381	379	382	389	398	410	426	448	476	513	563
1980 FEB 21.0	588	553	519	486	455	425	400	398	617	323	284	255	229	205	184	167	155	154	164	189	230
JD 2444280.5	321	322	324	328	333	341	364	611	452	366	359	362	368	378	390	405	425	450	483	527	585
1980 FEB 11.0	519	490	462	435	409	385	368	477	360	287	256	231	207	186	168	154	148	153	170	203	251
JD 2444270.5	278	282	288	295	305	320	378	1124	368	341	341	348	357	369	384	402	425	455	494	544	612
1980 FEB 1.0	460	436	413	391	369	350	353	784	298	258	232	209	188	169	154	145	144	156	180	220	276
JD 2444260.5	244	250	258	268	282	311	514	454	329	321	326	336	347	362	379	401	428	463	507	565	644
1980 JAN 22.0	408	389	370	352	334	323	408	355	261	232	209	189	170	154	143	138	144	162	194	241	305
JD 2444250.5	215	223	233	247	267	327	1434	339	304	305	314	326	340	357	377	402	433	473	523	591	682
1980 JAN 12.0	364	348	333	317	304	310	992	276	233	209	189	171	155	142	135	136	148	172	211	265	338
JD 2444240.5	193	201	213	230	262	437	467	294	285	292	303	317	334	353	377	405	441	485	544	622	728
1980 JAN 2.0	324	312	299	287	281	352	359	238	209	189	171	155	142	133	130	136	155	186	231	293	376
JD 2444230.5	175	184	198	220	280	1274	313	268	270	281	295	311	330	352	378	410	450	502	568	658	782
1979 DEC 23.0	290	280	270	261	270	884	257	210	189	171	156	142	131	126	128	141	165	202	254	325	420
JD 2444220.5	161	170	187	220	375	483	261	251	259	272	288	306	327	352	382	418	463	521	598	702	846
1979 DEC 13.0	259	251	244	241	304	367	216	188	170	155	142	131	123	122	130	148	178	222	282	362	471
JD 2444210.5	150	160	181	239	1036	287	235	237	249	264	282	303	326	354	387	428	479	545	634	755	923
1979 DEC 3.0	232	226	221	232	724	239	189	169	154	141	130	122	118	122	135	159	195	245	313	406	531
JD 2444200.5	143	154	184	323	489	230	218	227	241	259	278	301	327	358	394	440	498	574	677	818	1013
1979 NOV 23.0	207	203	204	261	371	195	168	152	140	129	120	115	116	124	143	172	214	272	350	456	600
(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M16 E11

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)
JD 2444320.5	-188	-184	-178	-169	-159	-150	-144	-151	-208	-674	260	177	168	178	193	211	228	243	254	262	265
1980 MAR 22.0	3231	3246	3272	3307	3351	3403	3462	3531	19	38	3539	87	179	262	344	426	511	597	684	773	861
JD 2444310.5	-196	-193	-187	-179	-171	-165	-166	-192	-339	415	206	165	164	177	194	212	229	244	255	263	266
1980 MAR 12.0	3226	3242	3270	3307	3353	3407	3469	3545	60	3167	3582	94	181	262	343	425	509	595	682	769	855
JD 2444300.5	-205	-202	-197	-191	-185	-184	-197	-260	-653	296	177	157	162	176	194	212	229	244	256	263	267
1980 MAR 2.0	3228	3244	3272	3310	3358	3414	3481	3570	98	3421	2	99	182	262	342	424	507	592	678	764	849
JD 2444290.5	-212	-211	-207	-203	-202	-208	-241	-386	418	223	160	151	159	175	193	212	229	244	256	264	267
1980 FEB 21.0	3235	3250	3278	3317	3366	3425	3500	17	2921	3489	14	102	183	262	342	423	506	590	675	759	842
JD 2444280.5	-220	-220	-219	-218	-222	-241	-311	-648	342	184	148	146	157	174	193	212	229	244	256	264	268
1980 FEB 11.0	3249	3262	3288	3327	3378	3441	3530	105	3295	3520	22	106	184	262	341	422	503	586	670	753	833
JD 2444270.5	-227	-230	-232	-236	-249	-288	-431	369	249	159	139	142	156	173	192	211	229	244	256	263	268
1980 FEB 1.0	3270	3279	3303	3342	3394	3465	3584	2690	3398	3538	28	108	186	263	341	420	501	583	665	746	823
JD 2444260.5	-234	-240	-247	-258	-284	-360	-656	391	196	142	132	139	154	172	192	211	228	243	255	263	267
1980 JAN 22.0	3297	3301	3323	3361	3417	3502	109	3165	3441	3550	34	111	187	263	340	418	498	579	659	737	811
JD 2444250.5	-240	-252	-265	-285	-333	-475	285	283	163	130	126	136	157	171	190	209	227	242	254	262	266
1980 JAN 12.0	3330	3328	3347	3385	3448	3567	2500	3310	3466	3559	38	113	188	262	338	416	494	573	652	727	797
JD 2444240.5	-247	-266	-287	-322	-404	-670	439	215	140	120	121	133	150	169	189	208	225	240	252	260	265
1980 JAN 2.0	3368	3361	3377	3417	3494	128	3037	3370	3483	3567	42	115	188	262	337	413	490	568	643	716	781
JD 2444230.5	-253	-281	-314	-371	-513	-696	321	171	123	112	117	130	147	167	187	206	223	238	250	258	262
1979 DEC 23.0	3413	3399	3413	3458	3575	1908	3232	3403	3496	3573	46	117	189	261	335	410	485	561	634	702	761
JD 2444220.5	-259	-299	-349	-441	-682	483	239	142	110	104	112	126	144	164	184	203	221	235	247	255	259
1979 DEC 13.0	3460	3443	3456	3518	177	2921	3308	3425	3507	3579	49	118	189	260	332	406	480	552	622	686	738
JD 2444210.5	-266	-321	-395	-541	-721	363	184	119	99	98	107	123	141	161	181	200	218	232	243	251	255
1979 DEC 3.0	3511	3491	3510	17	1630	2169	3351	3442	3515	3574	52	119	188	258	329	401	473	543	609	666	710
JD 2444200.5	-274	-349	-458	-683	524	266	146	102	89	91	102	119	138	158	178	197	214	228	239	246	249
1979 NOV 23.0	3562	3545	3583	257	2830	3263	3379	3455	3523	3588	54	120	187	256	326	396	465	532	593	644	677

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)

JD2444400.5	JD2444440.5	JD2444480.5	JD2444520.5	JD2444560.5
1980 JUN 10.0	1980 JUL 20.0	1980 AUG 29.0	1980 OCT 8.0	1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E11

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

	(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)
JD 2444320.5		228	235	243	250	259	270	285	311	373	657	67	161	192	206	213	213	205	185	149	99	42
1980 MAR 22.0		641	665	688	712	736	760	786	813	847	1321	918	940	979	1027	1087	1162	1257	1375	1515	1666	1807
JD 2444310.5		225	233	241	250	260	274	295	335	465	-159	112	170	195	207	213	212	201	177	135	82	28
1980 MAR 12.0		619	640	662	684	706	730	754	781	832	961	886	916	959	1013	1080	1165	1273	1405	1555	1704	1836
JD 2444300.5		222	230	239	250	263	281	310	379	676	5	133	175	196	207	213	210	196	166	120	66	17
1980 MAR 2.0		596	615	635	655	677	699	723	751	1036	855	860	896	943	1003	1078	1175	1297	1442	1596	1738	1856
JD 2444290.5		219	228	238	250	266	290	335	466	-243	68	144	177	196	207	211	206	188	152	103	53	10
1980 FEB 21.0		572	589	608	627	647	668	691	726	992	816	838	878	930	997	1083	1194	1329	1482	1634	1765	1867
JD 2444280.5		215	225	236	251	272	305	377	665	-67	96	150	178	195	206	209	201	177	137	89	43	7
1980 FEB 11.0		548	564	580	598	617	637	658	807	807	788	818	863	921	997	1096	1220	1368	1524	1668	1784	1870
JD 2444270.5		212	222	236	254	280	329	461	-263	15	111	153	177	194	204	205	193	164	122	76	37	7
1980 FEB 1.0		524	538	553	570	587	604	625	1059	755	766	802	852	918	1005	1116	1254	1409	1563	1693	1794	1865
JD 2444260.5		208	221	236	259	295	371	643	-144	53	119	154	176	192	201	199	183	151	108	67	34	11
1980 JAN 22.0		501	513	527	542	557	570	634	774	724	747	789	846	921	1019	1145	1294	1451	1595	1711	1796	1854
JD 2444250.5		205	219	239	267	319	452	-206	-42	73	123	153	175	190	197	192	172	137	97	62	35	17
1980 JAN 12.0		478	488	500	513	525	531	1111	703	701	732	780	845	931	1042	1181	1337	1490	1620	1720	1791	1836
JD 2444240.5		203	220	243	282	361	621	-215	6	84	125	152	172	187	192	184	159	125	89	60	39	26
1980 JAN 2.0		455	464	474	484	490	500	756	668	684	722	777	851	948	1073	1222	1379	1522	1637	1722	1779	1812
JD 2444230.5		202	222	252	307	440	695	-100	31	89	124	150	170	183	186	173	147	115	85	61	46	38
1979 DEC 23.0		434	440	448	454	447	1260	662	645	671	716	779	864	974	1112	1266	1418	1547	1645	1716	1761	1782
JD 2444220.5		202	227	267	350	600	-274	-42	45	92	124	148	168	179	178	163	137	109	84	66	55	53
1979 DEC 13.0		413	418	422	419	391	747	621	629	664	716	789	885	1008	1155	1309	1449	1562	1646	1703	1736	1746
JD 2444210.5		204	236	293	429	774	-156	-11	53	93	122	146	165	174	170	153	129	105	86	73	67	71
1979 DEC 3.0		394	395	394	375	1035	629	598	619	662	723	806	915	1049	1200	1347	1472	1569	1639	1684	1706	1704
JD 2444200.5		210	252	337	583	-318	-89	6	57	93	121	145	162	168	162	145	124	105	91	83	82	91
1979 NOV 23.0		376	373	362	305	739	584	584	616	667	737	837	952	1094	1242	1377	1487	1569	1625	1659	1670	1654
	(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M16 E11

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)
JD 2444320.5 1980 MAR 22.0	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742
JD 2444310.5 1980 MAR 12.0	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701
JD 2444300.5 1980 MAR 2.0	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680
JD 2444290.5 1980 FEB 21.0	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680
JD 2444280.5 1980 FEB 11.0	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703
JD 2444270.5 1980 FEB 1.0	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746
JD 2444260.5 1980 JAN 22.0	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
JD 2444250.5 1980 JAN 12.0	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878
JD 2444240.5 1980 JAN 2.0	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958
JD 2444230.5 1979 DEC 23.0	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044
JD 2444220.5 1979 DEC 13.0	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133
JD 2444210.5 1979 DEC 3.0	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222
JD 2444200.5 1979 NOV 23.0	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)

JD2444400.5 1980 JUN 10.0 JD2444440.5 1980 JUL 20.0 JD2444480.5 1980 AUG 29.0 JD2444520.5 1980 OCT 8.0 JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E11

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)
JD 2444320.5	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
1980 MAR 22.0	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457
JD 2444310.5	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129
1980 MAR 12.0	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580
JD 2444300.5	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54
1980 MAR 2.0	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709
JD 2444290.5	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
1980 FEB 21.0	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726
JD 2444280.5	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117
1980 FEB 11.0	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599
JD 2444270.5	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187
1980 FEB 1.0	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473
JD 2444260.5	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244
1980 JAN 22.0	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359
JD 2444250.5	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289
1980 JAN 12.0	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256
JD 2444240.5	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322
1980 JAN 2.0	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166
JD 2444230.5	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345
1979 DEC 23.0	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085
JD 2444220.5	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361
1979 DEC 13.0	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012
JD 2444210.5	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370
1979 DEC 3.0	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947
JD 2444200.5	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375
1979 NOV 23.0	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M16 E11

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOMALY IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)
JD 2444320.5	922	1018	1113	1208	1304	1399	1495	1591	1686	1777	1883	1980	2079	2178	2277	2377	2478	2579	2680	2782	2883
1980 MAR 22.0	-723	-762	-804	-850	-898	-948	-1000	-1053	-1108	-1164	-1224	-1283	-1343	-1403	-1464	-1526	-1587	-1648	-1707	-1765	1779
JD 2444310.5	966	1061	1157	1252	1347	1443	1538	1634	1729	1833	1927	2024	2122	2221	2321	2421	2521	2622	2724	2825	2927
1980 MAR 12.0	-765	-804	-847	-893	-941	-991	-1043	-1097	-1152	-1210	-1268	-1326	-1386	-1447	-1507	-1568	-1628	-1688	-1746	1797	1745
JD 2444300.5	1010	1105	1200	1296	1391	1486	1582	1677	1770	1874	1970	2068	2166	2265	2364	2464	2565	2666	2767	2869	2971
1980 MAR 2.0	-810	-650	-892	-938	-986	-1036	-1088	-1142	-1197	-1255	-1312	-1371	-1430	-1490	-1550	-1610	-1669	-1727	-1784	1762	1713
JD 2444290.5	1053	1149	1244	1339	1435	1530	1625	1720	1826	1917	2014	2111	2210	2309	2408	2508	2609	2710	2811	2913	3014
1980 FEB 21.0	-858	-898	-940	-985	-1033	-1083	-1135	-1188	-1245	-1300	-1357	-1416	-1475	-1534	-1593	-1652	-1710	-1766	1779	1728	1684
JD 2444280.5	1097	1192	1288	1383	1478	1574	1669	1761	1865	1960	2057	2155	2253	2352	2452	2552	2652	2753	2855	2956	3058
1980 FEB 11.0	-910	-948	-990	-1035	-1082	-1131	-1183	-1236	-1291	-1346	-1403	-1461	-1519	-1577	-1636	-1693	-1749	1795	1744	1697	1656
JD 2444270.5	1141	1236	1331	1427	1522	1617	1712	1821	1908	2004	2101	2199	2297	2396	2495	2596	2696	2797	2898	3000	3102
1980 FEB 1.0	-965	-1001	-1042	-1086	-1132	-1181	-1232	-1285	-1338	-1393	-1449	-1506	-1563	-1621	-1678	-1734	-1788	1758	1710	1667	1632
JD 2444260.5	1185	1280	1375	1470	1566	1661	1754	1857	1951	2048	2145	2243	2341	2440	2539	2639	2740	2841	2942	3044	3146
1980 JAN 22.0	-1022	-1057	-1096	-1139	-1184	-1232	-1282	-1333	-1386	-1441	-1496	-1552	-1608	-1664	-1719	-1774	1773	1723	1678	1639	1611
JD 2444250.5	1229	1324	1419	1514	1610	1704	1819	1899	1995	2092	2189	2287	2385	2484	2583	2683	2784	2885	2986	3088	3190
1980 JAN 12.0	-1083	-1115	-1153	-1193	-1237	-1284	-1332	-1383	-1435	-1488	-1543	-1597	-1652	-1707	-1761	1786	1736	1689	1648	1615	1594
JD 2444240.5	1273	1368	1464	1559	1654	1747	1849	1943	2039	2136	2233	2331	2429	2528	2628	2728	2828	2929	3031	3132	3234
1980 JAN 2.0	-1146	-1176	-1211	-1250	-1292	-1337	-1384	-1434	-1484	-1536	-1589	-1643	-1696	-1749	1798	1748	1700	1657	1620	1594	1582
JD 2444230.5	1317	1413	1508	1603	1698	1781	1892	1987	2084	2180	2278	2375	2474	2573	2672	2772	2873	2974	3075	3177	3278
1979 DEC 23.0	-1211	-1238	-1270	-1307	-1348	-1393	-1436	-1484	-1534	-1584	-1636	-1688	-1739	-1791	1759	1711	1666	1627	1596	1576	1576
JD 2444220.5	1362	1458	1553	1648	1741	1843	1937	2032	2128	2225	2322	2420	2519	2618	2717	2817	2918	3019	3120	3222	3323
1979 DEC 13.0	-1277	-1301	-1331	-1366	-1404	-1444	-1489	-1535	-1583	-1632	-1682	-1732	-1782	1768	1720	1675	1634	1599	1574	1564	1577
JD 2444210.5	1408	1503	1598	1693	1780	1887	1982	2077	2174	2270	2368	2465	2564	2663	2762	2862	2963	3064	3165	3267	3368
1979 DEC 3.0	-1344	-1365	-1393	-1425	-1464	-1499	-1542	-1587	-1633	-1680	-1728	-1776	1775	1728	1683	1641	1604	1574	1556	1557	1586
JD 2444200.5	1453	1549	1644	1738	1839	1932	2027	2123	2219	2316	2413	2511	2610	2709	2808	2908	3009	3110	3211	3312	3414
1979 NOV 23.0	-1412	-1430	-1454	-1484	-1516	-1554	-1595	-1638	-1682	-1727	-1774	1779	1733	1689	1647	1608	1576	1552	1543	1557	1605

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M16 E11

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)
JD 2444320.5	164	167	176	191	215	255	323	459	835	4657	1136	530	351	268	222	194	177	168	164	166	173
1980 MAR 22.0	1434	1235	1076	947	841	755	683	624	576	534	505	479	459	444	435	430	430	435	446	464	490
JD 2444310.5	171	177	189	208	239	291	386	596	1395	3105	777	446	319	253	215	192	179	172	170	174	184
1980 MAR 12.0	1144	1008	897	803	725	660	606	560	523	494	468	448	434	424	418	417	421	430	445	468	499
JD 2444300.5	178	187	202	227	267	336	472	827	3510	1371	599	389	294	241	210	191	180	175	176	183	197
1980 MAR 2.0	933	839	759	691	633	584	542	507	477	456	437	422	412	407	405	407	415	428	447	474	511
JD 2444290.5	186	197	217	249	301	395	598	1302	4371	887	492	347	273	231	205	190	181	179	182	192	210
1980 FEB 21.0	775	709	651	601	558	521	489	463	443	424	410	400	394	392	394	400	411	427	451	483	526
JD 2444280.5	193	209	234	274	342	473	804	2820	1630	661	420	314	256	222	201	188	183	183	189	202	225
1980 FEB 11.0	654	607	566	529	497	469	445	424	410	397	388	382	379	380	385	394	409	429	457	494	544
JD 2444270.5	202	221	252	304	395	587	1209	6206	989	529	367	287	241	213	196	187	184	187	196	213	241
1980 FEB 1.0	559	527	497	470	446	426	408	397	383	374	368	366	366	370	378	391	408	433	465	508	566
JD 2444260.5	210	235	274	340	465	770	2359	1905	711	442	327	265	228	206	192	186	185	191	203	224	260
1980 JAN 22.0	485	462	441	422	404	389	376	368	360	355	352	353	356	363	374	389	410	439	476	526	591
JD 2444250.5	220	250	300	387	567	1116	8485	1076	554	379	294	246	217	199	189	185	187	195	210	237	281
1980 JAN 12.0	426	410	395	382	369	359	356	345	340	338	338	341	348	357	371	389	414	447	490	547	621
JD 2444240.5	231	268	331	449	727	2026	2179	744	453	332	268	229	206	192	185	184	188	199	219	252	308
1980 JAN 2.0	379	368	358	348	340	333	330	325	324	324	327	332	341	353	370	392	420	458	507	572	656
JD 2444230.5	243	289	371	538	1024	7395	1136	564	381	294	245	215	196	186	181	182	190	204	228	269	340
1979 DEC 23.0	341	334	327	321	316	309	310	309	310	312	318	325	336	351	370	396	429	471	527	601	696
JD 2444220.5	257	316	425	677	1767	2411	754	451	327	263	225	201	187	179	178	181	191	209	239	289	382
1979 DEC 13.0	311	306	302	298	295	295	294	295	296	303	310	320	333	350	373	402	439	488	551	635	742
JD 2444210.5	273	349	501	932	5867	1154	555	372	285	236	207	188	178	173	174	180	193	215	251	315	440
1979 DEC 3.0	286	283	281	279	277	279	281	284	288	295	304	316	332	352	377	410	452	508	580	675	792
JD 2444200.5	294	393	621	1554	2539	734	433	313	250	213	190	176	169	167	170	179	195	221	266	347	524
1979 NOV 23.0	267	265	264	263	265	267	270	274	280	289	300	314	332	354	383	420	468	531	614	720	846

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)
	JD2444400.5			JD2444440.5			JD2444480.5			JD2444520.5			JD2444560.5								
	1980 JUN 10.0			1980 JUL 20.0			1980 AUG 29.0			1980 OCT 8.0			1980 NOV 17.0								

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M16 E11

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

	(FLT T)(80)(90)(100)(110)(120)(130)(140)(150)(160)(170)(180)(190)(200)(210)(220)(230)(240)(250)(260)(270)(280)
JD 2444320.5	980 962 943 923 905 887 870 854 838 825 805 790 774 757 739 719 697 672 643 610 569
1980 MAR 22.0	-9999-9999-9999-9999-9999-6340-4621-3689-3111-2719-2446-2241-2086-1967-1874-1802-1747-1706-1679-1664 1664
JD 2444310.5	983 966 949 931 914 897 880 864 849 830 816 800 783 764 745 724 700 672 641 604 559
1980 MAR 12.0	-9999-9999-9999-8540-5739-4380-3584-3066-2706-2448-2250-2098-1981-1888-1816-1759-1717-1687-1669 1665 1672
JD 2444300.5	986 971 955 939 922 906 890 874 860 841 825 808 790 771 750 727 701 672 637 596 546
1980 MAR 2.0	-9999-9999-6973-5134-4101-3446-2997-2673-2430-2249-2104-1989-1899-1827-1770-1727-1695-1675-1665 1669 1686
JD 2444290.5	990 977 962 946 931 915 899 884 864 850 834 816 797 777 755 730 702 669 631 586 530
1980 FEB 21.0	-7797-5730-4554-3800-3281-2904-2622-2405-2239-2101-1992-1905-1834-1778-1734-1701-1679-1667 1667 1678 1704
JD 2444280.5	994 982 968 954 939 924 908 894 875 859 841 823 803 782 758 731 701 666 624 573 510
1980 FEB 11.0	-4744-4017-3490-3096-2792-2555-2365-2211-2091-1989-1906-1838-1783-1740-1706-1682-1668 1665 1672 1691 1727
JD 2444270.5	998 987 975 961 947 932 917 895 883 866 848 829 808 786 760 732 699 660 614 557 487
1980 FEB 1.0	-3532-3183-2899-2665-2472-2313-2180-2075-1978-1901-1837-1785-1742-1709-1685-1669-1662 1666 1681 1709 1755
JD 2444260.5	1002 992 981 968 954 939 925 906 891 873 855 834 813 788 761 730 695 652 601 538 460
1980 JAN 22.0	-2889-2697-2527-2378-2249-2137-2040-1961-1891-1832-1783-1742-1710-1685-1669-1660 1662 1672 1694 1732 1789
JD 2444250.5	1006 997 986 974 961 947 924 914 897 879 860 839 816 790 761 728 689 642 586 516 427
1980 JAN 12.0	-2497-2382-2274-2175-2085-2005-1943-1875-1822-1777-1739-1708-1684-1667-1658 1657 1664 1681 1712 1760 1830
JD 2444240.5	1009 1001 991 980 967 953 936 920 903 885 865 843 818 791 760 724 681 630 567 489 389
1980 JAN 2.0	-2238-2166-2095-2026-1963-1904-1854-1807-1767-1732-1704-1681-1664-1654 1652 1656 1670 1695 1734 1793 1876
JD 2444230.5	1011 1005 996 985 972 963 942 926 908 889 869 845 820 791 757 718 672 615 545 457 346
1979 DEC 23.0	-2056-2010-1962-1914-1869-1822-1788-1753-1726-1697-1676-1660-1649-1645 1648 1659 1679 1712 1761 1832 1930
JD 2444220.5	1013 1007 999 989 977 962 947 931 913 893 872 847 820 789 753 711 660 597 519 419 296
1979 DEC 13.0	-1924-1894-1862-1828-1795-1766-1736-1710-1687-1668-1653-1643-1639 1641 1649 1665 1693 1734 1794 1878 1992
JD 2444210.5	1014 1010 1003 993 984 967 952 935 917 896 874 848 820 786 747 701 645 575 487 375 239
1979 DEC 3.0	-1826-1807-1785-1761-1735-1715-1694-1675-1658-1645-1636-1631 1633 1639 1652 1675 1710 1761 1832 1932 2062
JD 2444200.5	1015 1012 1005 996 983 971 956 939 920 899 875 848 818 782 740 689 627 549 450 325 178
1979 NOV 23.0	-1752-1740-1725-1708-1693-1675-1660-1647-1636-1628-1623 1624 1629 1640 1659 1689 1732 1793 1878 1994 2138
	(FLT T)(200)(210)(220)(230)(240)(250)(260)(270)(280)(290)(300)(310)(320)(330)(340)(350)(360)(370)(380)(390)(400)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E11

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280
JD 2444320.5	61	70	81	91	102	114	125	137	149	160	174	186	198	211	224	238	252	266	282	299	318
1980 MAR 22.0	69	79	89	99	109	119	130	141	151	161	172	183	194	204	215	226	236	247	257	268	278
JD 2444310.5	68	77	87	98	109	120	131	143	154	167	179	191	203	216	229	243	257	271	287	305	324
1980 MAR 12.0	77	87	97	107	117	127	138	148	159	169	180	190	201	211	222	233	243	254	264	274	285
JD 2444300.5	74	84	94	104	115	126	137	148	159	172	184	196	208	221	234	247	261	276	292	311	332
1980 MAR 2.0	85	95	105	115	125	135	145	156	166	177	187	198	208	218	229	239	250	260	271	281	291
JD 2444290.5	81	90	100	110	121	132	142	153	166	177	188	200	213	225	238	252	266	281	298	317	340
1980 FEB 21.0	93	103	112	122	132	143	153	163	174	184	194	205	215	225	236	246	257	267	277	288	298
JD 2444280.5	87	96	106	116	127	137	148	158	170	182	193	205	217	230	243	256	271	286	304	324	350
1980 FEB 11.0	101	110	120	130	140	150	160	170	181	191	201	212	222	232	243	253	263	274	284	294	304
JD 2444270.5	93	102	112	122	132	142	153	165	175	186	198	210	222	234	247	261	276	292	310	332	360
1980 FEB 1.0	108	118	128	138	147	157	167	178	188	198	208	219	229	239	249	260	270	280	290	300	310
JD 2444260.5	99	108	117	127	137	147	158	169	180	191	202	214	226	239	252	266	281	298	317	341	373
1980 JAN 22.0	116	125	135	145	155	165	174	185	195	205	215	225	236	246	256	266	277	287	297	307	316
JD 2444250.5	104	113	123	132	142	152	165	174	185	196	207	219	231	243	257	271	286	304	324	351	389
1980 JAN 12.0	123	133	142	152	162	172	183	192	202	212	222	232	242	253	263	273	283	293	303	313	322
JD 2444240.5	110	119	128	138	147	157	168	179	189	200	212	223	235	248	261	276	292	310	333	363	409
1980 JAN 2.0	131	140	150	159	169	179	189	199	209	219	229	239	249	259	269	280	290	300	310	319	328
JD 2444230.5	115	124	133	143	152	161	173	183	194	205	216	228	240	253	266	281	298	317	342	377	434
1979 DEC 23.0	138	147	157	166	176	185	196	206	216	226	236	246	256	266	276	286	296	306	316	325	334
JD 2444220.5	120	129	138	148	157	168	177	188	198	209	221	232	244	257	271	286	304	325	353	395	470
1979 DEC 13.0	145	155	164	174	183	193	203	213	223	233	243	253	263	273	283	293	303	312	322	331	340
JD 2444210.5	125	134	143	152	161	172	182	192	203	214	225	237	249	262	276	292	311	334	366	418	522
1979 DEC 3.0	152	162	171	181	190	200	210	220	229	239	249	259	269	279	289	299	309	319	328	337	346
JD 2444200.5	130	139	148	157	167	177	187	197	207	218	230	241	254	267	282	298	318	344	382	450	604
1979 NOV 23.0	159	169	178	187	197	207	217	226	236	246	256	266	276	286	296	306	315	325	334	343	351

(FLT T)	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390	400

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M16 E11

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)
JD 2444320.5 1980 MAR 22.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444310.5 1980 MAR 12.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444300.5 1980 MAR 2.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444290.5 1980 FEB 21.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444280.5 1980 FEB 11.0	1464	1465	1470	1477	1488	1504	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444270.5 1980 FEB 1.0	1384	1391	1402	1415	1433	1463	1524	1524	1524	1504	1504	1517	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444260.5 1980 JAN 22.0	1325	1335	1349	1367	1391	1444	1524	1524	1479	1465	1475	1493	1516	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444250.5 1980 JAN 12.0	1281	1292	1308	1330	1364	1475	1524	1499	1431	1434	1450	1473	1501	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444240.5 1980 JAN 2.0	1248	1260	1278	1303	1356	1524	1524	1413	1396	1409	1430	1457	1489	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444230.5 1979 DEC 23.0	1224	1236	1255	1288	1387	1524	1448	1367	1370	1389	1414	1444	1481	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444220.5 1979 DEC 13.0	1207	1219	1240	1287	1524	1524	1354	1336	1350	1372	1401	1435	1476	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444210.5 1979 DEC 3.0	1195	1207	1233	1317	1524	1401	1310	1314	1334	1360	1391	1429	1474	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444200.5 1979 NOV 23.0	1187	1200	1237	1467	1524	1303	1284	1298	1321	1350	1384	1426	1475	1524	1524	1524	1524	1524	1524	1524	1524

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)

JD2444400.5 1980 JUN 10.0 JD2444440.5 1980 JUL 20.0 JD2444480.5 1980 AUG 29.0 JD2444520.5 1980 OCT 8.0 JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

M16
E11

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 1524

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)
JD 2444320.5	629	536	468	416	372	335	305	285	300	1503	312	215	192	183	182	188	202	225	259	309	380
1980 MAR 22.0	2370	2151	1961	1790	1634	1491	1359	1239	1148	1824	955	810	712	626	548	480	423	381	359	364	402
JD 2444310.5	375	324	287	257	233	214	201	203	321	842	192	152	142	142	148	162	183	214	259	320	406
1980 MAR 12.0	2014	1847	1698	1559	1431	1311	1201	1105	1088	1310	823	717	631	555	487	429	382	353	345	367	425
JD 2444300.5	187	161	144	132	123	117	119	154	955	250	117	101	100	107	121	141	170	210	264	338	441
1980 MAR 2.0	1727	1597	1476	1363	1257	1157	1066	999	1432	884	723	636	561	494	435	386	351	334	341	380	458
JD 2444290.5	46	37	33	32	34	40	59	180	1272	106	61	58	65	78	98	125	161	210	275	364	485
1980 FEB 21.0	1489	1386	1289	1196	1108	1024	953	949	1573	742	639	565	499	441	391	351	327	323	346	403	501
JD 2444280.5	0	0	0	0	0	0	27	607	221	31	17	22	36	55	81	114	158	216	293	397	541
1980 FEB 11.0	1289	1208	1129	1052	979	911	865	1171	842	647	567	503	445	395	354	324	312	321	360	435	554
JD 2444270.5	0	0	0	0	0	0	57	2002	34	0	0	0	12	36	68	108	160	227	317	439	608
1980 FEB 1.0	1121	1055	991	928	867	816	823	2058	675	570	505	448	399	356	324	305	304	328	383	476	618
JD 2444260.5	0	0	0	0	0	0	365	225	0	0	0	0	0	22	59	106	166	244	349	491	690
1980 JAN 22.0	977	924	872	820	772	742	977	829	580	506	450	402	359	325	301	292	304	342	414	527	693
JD 2444250.5	0	0	0	0	0	0	2890	0	0	0	0	0	0	11	54	108	177	268	389	555	790
1980 JAN 12.0	853	811	768	727	692	708	2669	618	509	450	403	361	326	300	285	287	311	364	453	588	782
JD 2444240.5	0	0	0	0	0	186	254	0	0	0	0	0	0	5	53	115	194	298	439	634	910
1980 JAN 2.0	746	713	679	647	630	822	840	520	451	403	362	327	299	281	275	288	326	394	503	661	887
JD 2444230.5	0	0	0	0	0	2428	0	0	0	0	0	0	0	1	56	126	216	336	500	729	1055
1979 DEC 23.0	654	628	601	580	602	2349	569	453	402	362	328	299	278	268	272	297	348	433	562	747	1009
JD 2444220.5	0	0	0	0	49	291	0	0	0	0	0	0	0	2	64	142	245	384	574	844	1230
1979 DEC 13.0	574	554	535	529	692	864	466	400	360	327	299	277	263	261	275	312	378	481	632	849	1154
JD 2444210.5	0	0	0	0	1755	0	0	0	0	0	0	0	0	6	75	164	282	442	665	984	1440
1979 DEC 3.0	505	490	480	506	1882	524	402	357	325	297	275	260	253	260	285	334	416	538	716	969	1324
JD 2444200.5	0	0	0	0	306	0	0	0	0	0	0	0	0	13	91	192	328	514	776	1154	1691
1979 NOV 23.0	445	436	438	580	875	416	355	321	295	274	257	248	249	265	301	364	462	607	816	1112	1524

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E11

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)
JD 2444320.5	2999	2687	2429	2206	2006	1826	1664	1524	1449	3327	1267	1025	904	809	731	668	625	606	618	673	782
1980 MAR 22.0	922	1018	1113	1208	1304	1399	1495	1591	1686	1777	1883	1980	2079	2178	2277	2377	2478	2579	2680	2782	2883
JD 2444310.5	2389	2171	1984	1816	1664	1526	1402	1308	1409	2152	1016	869	774	697	636	591	565	567	604	687	831
1980 MAR 12.0	966	1061	1157	1252	1347	1443	1538	1634	1729	1833	1927	2024	2122	2221	2321	2421	2521	2622	2724	2825	2927
JD 2444300.5	1914	1758	1620	1495	1380	1274	1185	1153	2367	1134	840	736	661	601	556	527	520	543	605	719	899
1980 MAR 2.0	1010	1105	1200	1296	1391	1486	1582	1677	1770	1874	1970	2068	2166	2265	2364	2464	2565	2666	2767	2869	2971
JD 2444290.5	1535	1423	1322	1228	1142	1064	1012	1130	2845	848	701	622	564	519	489	477	489	533	621	766	986
1980 FEB 21.0	1053	1149	1244	1339	1435	1530	1625	1720	1826	1917	2014	2111	2210	2309	2408	2508	2609	2710	2811	2913	3014
JD 2444280.5	1289	1208	1129	1052	979	911	892	1778	1063	678	584	525	481	450	434	439	470	537	653	832	1094
1980 FEB 11.0	1097	1192	1288	1383	1478	1574	1669	1761	1865	1960	2057	2155	2253	2352	2452	2552	2652	2753	2855	2956	3058
JD 2444270.5	1121	1055	991	928	867	816	880	4059	709	570	505	448	411	393	392	413	463	555	700	915	1226
1980 FEB 1.0	1141	1236	1331	1427	1522	1617	1712	1821	1908	2004	2101	2199	2297	2396	2495	2596	2696	2797	2898	3000	3102
JD 2444260.5	977	924	872	820	772	742	1342	1053	580	506	450	402	359	347	360	398	470	586	762	1018	1384
1980 JAN 22.0	1185	1280	1375	1470	1566	1661	1754	1857	1951	2048	2145	2243	2341	2440	2539	2639	2740	2841	2942	3044	3146
JD 2444250.5	853	811	768	727	692	708	5556	618	509	450	403	361	326	311	339	395	488	632	842	1144	1572
1980 JAN 12.0	1229	1324	1419	1514	1610	1704	1819	1899	1995	2092	2189	2287	2385	2484	2583	2683	2784	2885	2986	3088	3190
JD 2444240.5	746	713	679	647	630	1008	1094	520	451	403	362	327	299	285	329	403	520	692	941	1295	1797
1980 JAN 2.0	1273	1368	1464	1559	1654	1747	1849	1943	2039	2136	2233	2331	2429	2528	2628	2728	2828	2929	3031	3132	3234
JD 2444230.5	654	628	601	580	602	4778	569	453	402	362	328	299	278	269	329	423	564	769	1061	1476	2064
1979 DEC 23.0	1317	1413	1508	1603	1698	1781	1892	1987	2084	2180	2278	2375	2474	2573	2672	2772	2873	2974	3075	3177	3278
JD 2444220.5	574	554	535	529	741	1155	466	400	360	327	299	277	263	263	339	455	623	864	1207	1693	2384
1979 DEC 13.0	1362	1458	1553	1648	1741	1843	1937	2032	2128	2225	2322	2420	2519	2618	2717	2817	2918	3019	3120	3222	3323
JD 2444210.5	505	490	480	506	3637	524	402	357	325	297	275	260	253	266	360	499	698	980	1381	1953	2764
1979 DEC 3.0	1408	1503	1598	1693	1780	1887	1982	2077	2174	2270	2368	2465	2564	2663	2762	2862	2963	3064	3165	3267	3368
JD 2444200.5	445	436	438	580	1180	416	355	321	295	274	257	248	249	278	392	556	790	1121	1592	2266	3215
1979 NOV 23.0	1453	1549	1644	1738	1839	1932	2027	2123	2219	2316	2413	2511	2610	2709	2808	2908	3009	3110	3211	3312	3414

(FLT T)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

M16
E12

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444500.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671728	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.609	DEGREES
MEAN ANOM. AT EPOCH	=	2?4.464	DEGREES
DATE OF NODAL PASSAGE	=	2444505.371	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444500.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338765	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.409	DEGREES
ARG. OF PERIHELION	=	286.295	DEGREES
MEAN ANOM. AT EPOCH	=	287.922	DEGREES
DATE OF NODAL PASSAGE	=	2444072.517	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.064	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E12

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD 2444320.5	520	561	618	698	811	969	1179	1419	1421	1349	1278	1206	1136	1066	997	930	865	802	741	683	626
1980 MAR 22.0	189	222	273	343	438	564	723	899	916	874	832	791	750	711	673	636	602	568	537	507	480
JD 2444310.5	531	579	647	742	875	1058	1287	1464	1393	1322	1251	1180	1109	1040	972	906	842	780	720	662	606
1980 MAR 12.0	199	240	299	380	488	629	799	939	896	854	812	771	731	692	655	619	585	552	521	493	466
JD 2444300.5	545	602	682	794	949	1156	1398	1437	1366	1295	1224	1153	1084	1015	948	882	819	758	698	641	587
1980 MAR 2.0	212	262	330	422	545	700	877	919	877	835	793	752	713	674	637	602	568	537	507	479	453
JD 2444290.5	563	630	724	855	1035	1263	1479	1410	1339	1268	1197	1127	1058	990	924	859	796	736	678	622	568
1980 FEB 21.0	230	288	366	470	608	776	943	900	858	816	775	734	695	657	621	586	553	522	492	465	440
JD 2444280.5	585	664	774	926	1131	1374	1452	1383	1312	1242	1171	1101	1033	966	900	836	774	715	657	602	550
1980 FEB 11.0	251	317	406	525	678	855	924	882	839	798	757	717	678	640	605	570	538	507	479	452	428
JD 2444270.5	612	704	832	1009	1236	0	1425	1356	1285	1215	1145	1076	1008	941	877	814	753	694	637	583	532
1980 FEB 1.0	276	351	453	587	754	0	906	864	822	780	739	700	661	624	589	556	524	494	466	440	417
JD 2444260.5	644	752	901	1103	1347	1467	1398	1329	1259	1189	1119	1051	983	918	854	791	731	674	618	565	516
1980 JAN 22.0	305	391	506	656	834	932	889	847	805	763	723	684	646	609	574	541	510	481	454	429	407
JD 2444250.5	682	808	981	1207	1460	1440	1371	1302	1232	1162	1094	1026	959	894	831	770	711	654	599	548	500
1980 JAN 12.0	338	436	567	732	915	915	873	830	788	747	707	668	630	594	560	528	497	469	442	418	397
JD 2444240.5	728	874	1073	1320	1480	1412	1344	1275	1205	1136	1068	1001	935	871	809	748	690	634	581	531	487
1980 JAN 2.0	376	488	635	814	942	899	856	814	772	731	691	653	616	580	546	515	485	457	431	408	389
JD 2444230.5	782	952	1177	1436	1453	1385	1317	1248	1179	1110	1043	976	911	848	787	727	670	615	563	515	476
1979 DEC 23.0	420	548	713	900	926	883	840	798	756	716	676	638	601	567	533	502	473	445	420	399	383
JD 2444220.5	846	1043	1291	1491	1425	1358	1289	1221	1152	1085	1018	952	888	825	765	706	650	596	546	500	476
1979 DEC 13.0	471	617	797	954	911	868	825	783	741	701	662	624	588	553	521	490	461	435	411	390	382
JD 2444210.5	923	1147	1412	1464	1397	1330	1262	1194	1126	1059	993	928	864	803	743	686	631	578	529	488	515
1979 DEC 3.0	531	695	887	939	896	853	810	768	727	687	648	611	575	541	509	479	450	425	401	384	405
JD 2444200.5	1013	1264	0	1436	1370	1302	1235	1167	1100	1033	968	904	841	781	722	666	611	560	513	484	944
1979 NOV 23.0	600	783	0	925	882	839	796	754	713	673	635	598	562	529	497	468	440	415	393	381	677

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E12

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD 2444320.5	265	264	259	250	240	231	223	218	129	150	169	186	199	210	217	220	220	216	208	196	180
1980 MAR 22.0	861	946	1028	1102	1166	1214	1242	1253	340	407	474	543	613	684	756	828	899	970	1039	1107	1172
JD 2444310.5	266	265	261	253	244	236	230	100	124	145	165	182	196	207	214	218	219	215	207	195	178
1980 MAR 12.0	855	939	1018	1088	1146	1185	1204	261	326	393	461	530	600	670	742	813	885	955	1024	1092	1156
JD 2444300.5	267	266	262	256	248	242	237	95	119	141	161	178	193	204	212	216	217	213	206	193	175
1980 MAR 2.0	849	931	1006	1071	1121	1151	1162	247	313	380	447	516	586	657	728	799	870	941	1010	1076	1140
JD 2444290.5	267	267	264	258	252	247	64	90	114	136	156	174	189	201	209	214	215	212	204	190	171
1980 FEB 21.0	842	921	991	1050	1092	1112	169	234	300	366	434	503	572	643	714	785	856	926	995	1061	1124
JD 2444280.5	268	268	265	260	256	251	59	84	109	132	152	170	186	198	207	212	213	209	201	187	165
1980 FEB 11.0	833	908	974	1026	1058	1070	157	221	287	354	421	490	559	630	701	772	842	912	980	1046	1107
JD 2444270.5	268	268	266	262	258	0	53	79	104	127	148	166	182	195	204	209	210	207	198	182	157
1980 FEB 1.0	823	894	954	997	1019	0	144	209	274	341	408	477	546	616	687	758	828	898	965	1030	1091
JD 2444260.5	267	268	266	263	260	21	48	74	99	122	144	162	178	191	201	206	208	204	194	177	146
1980 JAN 22.0	811	877	930	963	976	67	131	196	262	328	396	464	533	603	674	744	815	884	951	1014	1074
JD 2444250.5	266	267	266	263	260	15	43	69	94	118	139	158	175	188	198	203	205	200	190	169	131
1980 JAN 12.0	797	857	901	924	929	54	119	184	250	316	383	451	521	590	661	731	801	869	936	999	1057
JD 2444240.5	265	266	265	262	-17	10	37	64	89	113	135	154	171	185	194	200	201	196	184	159	108
1980 JAN 2.0	781	833	867	880	3577	42	107	172	237	304	371	439	508	578	648	718	787	855	921	983	1040
JD 2444230.5	262	264	262	259	-22	5	32	59	84	108	130	150	167	181	191	197	197	192	176	145	72
1979 DEC 23.0	761	805	829	833	3564	29	94	160	225	292	359	427	495	565	635	704	773	841	906	968	1024
JD 2444220.5	259	260	258	-55	-28	-0	27	54	79	104	126	146	163	177	187	193	193	186	167	125	9
1979 DEC 13.0	738	772	785	3486	3552	17	82	148	213	280	347	414	483	552	622	691	759	827	891	952	1011
JD 2444210.5	255	255	252	-61	-33	-5	22	49	75	99	122	142	159	174	184	189	188	179	154	93	-124
1979 DEC 3.0	710	734	737	3474	3539	5	70	136	201	263	335	402	471	539	609	677	746	812	877	938	1016
JD 2444200.5	249	248	0	-66	-38	-10	16	44	70	94	117	138	155	170	180	185	183	170	137	39	-426
1979 NOV 23.0	677	690	0	3461	3527	3593	58	124	190	256	323	390	458	527	595	664	732	798	863	928	1239

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E12

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

	(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD 2444320.5		42	-9	-48	-75	-92	-98	-93	-78	-124	-133	-142	-150	-157	-163	-169	-173	-177	-180	-181	-181	-180
1980 MAR 22.0		1807	1926	2015	2077	2110	2116	2090	2036	2081	2108	2134	2160	2186	2211	2236	2260	2284	2307	2330	2352	2373
JD 2444310.5		28	-16	-49	-70	-81	-82	-71	-102	-112	-122	-130	-138	-146	-152	-158	-163	-167	-170	-171	-171	-169
1980 MAR 12.0		1836	1939	2013	2059	2079	2070	2030	2024	2050	2077	2102	2128	2153	2178	2202	2226	2249	2272	2294	2315	2336
JD 2444300.5		17	-20	-47	-62	-68	-62	-46	-90	-100	-110	-119	-127	-135	-141	-147	-152	-156	-159	-160	-160	-156
1980 MAR 2.0		1856	1943	2002	2035	2041	2017	1965	1994	2020	2045	2071	2096	2120	2144	2168	2191	2214	2236	2258	2280	2300
JD 2444290.5		10	-20	-41	-51	-51	-40	-67	-78	-88	-98	-107	-115	-123	-130	-136	-141	-145	-147	-148	-147	-142
1980 FEB 21.0		1867	1939	1985	2004	1996	1959	1938	1964	1989	2014	2039	2063	2087	2111	2134	2157	2179	2201	2223	2244	2265
JD 2444280.5		7	-17	-33	-37	-31	-14	-54	-65	-75	-85	-94	-103	-110	-117	-123	-129	-133	-135	-136	-133	-127
1980 FEB 11.0		1870	1928	1961	1967	1945	1895	1909	1934	1959	1983	2007	2031	2055	2078	2101	2123	2145	2167	2188	2209	2230
JD 2444270.5		7	-11	-21	-20	-8	0	-41	-52	-62	-72	-81	-90	-98	-105	-111	-116	-120	-122	-122	-119	-110
1980 FEB 1.0		1865	1911	1930	1924	1888	0	1879	1904	1928	1952	1976	1999	2022	2045	2067	2089	2111	2132	2153	2174	2196
JD 2444260.5		11	-3	-7	-0	17	-17	-28	-39	-49	-59	-68	-77	-84	-91	-98	-103	-106	-108	-107	-102	-90
1980 JAN 22.0		1854	1887	1894	1874	1826	1824	1849	1873	1897	1921	1944	1967	1990	2012	2034	2055	2077	2098	2119	2140	2163
JD 2444250.5		17	8	10	22	45	-4	-15	-26	-36	-45	-55	-63	-71	-78	-84	-89	-92	-93	-91	-84	-66
1980 JAN 12.0		1836	1857	1852	1818	1758	1794	1819	1842	1866	1889	1912	1935	1957	1979	2000	2021	2042	2063	2085	2106	2130
JD 2444240.5		26	23	30	49	19	8	-2	-12	-22	-32	-41	-49	-57	-64	-70	-75	-77	-78	-74	-64	-36
1980 JAN 2.0		1812	1821	1802	1755	1740	1764	1788	1812	1835	1858	1880	1902	1924	1945	1966	1987	2008	2029	2051	2073	2100
JD 2444230.5		38	41	54	77	33	22	11	1	-8	-18	-27	-35	-43	-50	-55	-60	-62	-61	-56	-40	2
1979 DEC 23.0		1782	1778	1746	1687	1710	1733	1757	1780	1803	1826	1848	1869	1891	1912	1933	1953	1974	1995	2017	2041	2072
JD 2444220.5		53	61	80	57	46	35	25	15	5	-4	-13	-21	-28	-35	-41	-44	-46	-44	-36	-12	63
1979 DEC 13.0		1746	1729	1683	1655	1679	1702	1726	1749	1771	1793	1815	1836	1857	1878	1899	1919	1940	1961	1984	2010	2049
JD 2444210.5		71	84	108	70	59	49	38	29	19	10	1	-6	-14	-20	-25	-29	-29	-26	-13	24	181
1979 DEC 3.0		1704	1673	1613	1624	1647	1671	1694	1716	1739	1760	1782	1803	1824	1844	1865	1885	1906	1927	1951	1982	2035
JD 2444200.5		91	110	0	83	72	62	52	43	33	24	15	7	0	-5	-10	-12	-12	-5	14	79	486
1979 NOV 23.0		1654	1608	0	1592	1615	1638	1661	1684	1706	1727	1748	1769	1789	1810	1830	1850	1871	1894	1920	1959	1928

	(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E12

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD 2444320.5 1980 MAR 22.0	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742
JD 2444310.5 1980 MAR 12.0	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701	701
JD 2444300.5 1980 MAR 2.0	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680
JD 2444290.5 1980 FEB 21.0	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680	680
JD 2444280.5 1980 FEB 11.0	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703	703
JD 2444270.5 1980 FEB 1.0	746	746	746	746	746	0	746	746	746	746	746	746	746	746	746	746	746	746	746	746	746
JD 2444260.5 1980 JAN 22.0	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806	806
JD 2444250.5 1980 JAN 12.0	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878	878
JD 2444240.5 1980 JAN 2.0	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958	958
JD 2444230.5 1979 DEC 23.0	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044	1044
JD 2444220.5 1979 DEC 13.0	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133	1133
JD 2444210.5 1979 DEC 3.0	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222	1222
JD 2444200.5 1979 NOV 23.0	1311	1311	0	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311	1311

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)
JD2444600.5 1980 DEC 27.0				JD2444640.5 1981 FEB 5.0				JD2444680.5 1981 MAR 17.0					JD2444720.5 1981 APR 26.0				JD2444760.5 1981 JUN 5.0				

EARTH DEPARTURE OR ARRIVAL DATE

M16
E12

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD 2444320.5	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
1980 MAR 22.0	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457
JD 2444310.5	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129
1980 MAR 12.0	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580	1580
JD 2444300.5	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54
1980 MAR 2.0	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709	1709
JD 2444290.5	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
1980 FEB 21.0	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726
JD 2444280.5	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117
1980 FEB 11.0	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599	1599
JD 2444270.5	187	187	187	187	187	0	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187
1980 FEB 1.0	1473	1473	1473	1473	1473	0	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473	1473
JD 2444260.5	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244
1980 JAN 22.0	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359	1359
JD 2444250.5	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289
1980 JAN 12.0	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256	1256
JD 2444240.5	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322	322
1980 JAN 2.0	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166	1166
JD 2444230.5	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345	345
1979 DEC 23.0	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085	1085
JD 2444220.5	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361
1979 DEC 13.0	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012
JD 2444210.5	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370
1979 DEC 3.0	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947	947
JD 2444200.5	375	375	0	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375
1979 NOV 23.0	887	887	0	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887	887

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E12

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

= (FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD 2444320.5	2883	2985	3087	3189	3290	3391	3491	3582	94	193	291	389	486	583	680	776	872	968	1063	1158	1254
1980 MAR 22.0	1779	1729	1686	1654	1640	1654	1705	1782	1766	1731	1695	1659	1624	1589	1554	1520	1487	1455	1423	1393	1364
JD 2444310.5	2927	3029	3131	3232	3334	3435	3534	40	137	236	335	433	530	627	724	820	916	1011	1107	1202	1297
1980 MAR 12.0	1745	1699	1662	1638	1637	1668	1737	1786	1751	1715	1679	1643	1608	1573	1538	1505	1472	1440	1409	1379	1350
JD 2444300.5	2971	3073	3174	3276	3377	3478	3573	82	181	280	378	476	574	671	767	864	959	1055	1150	1246	1341
1980 MAR 2.0	1713	1672	1641	1628	1641	1691	1773	1771	1735	1699	1663	1627	1592	1557	1522	1489	1456	1424	1394	1364	1336
JD 2444290.5	3014	3116	3218	3320	3421	3521	30	125	224	323	422	520	618	715	811	907	1003	1099	1194	1289	1385
1980 FEB 21.0	1684	1648	1625	1624	1654	1723	1789	1755	1719	1683	1647	1611	1575	1541	1506	1473	1440	1409	1379	1349	1322
JD 2444280.5	3058	3160	3262	3363	3464	3562	70	169	268	367	466	564	661	758	855	951	1047	1142	1238	1333	1428
1980 FEB 11.0	1656	1627	1614	1627	1676	1760	1775	1739	1703	1666	1630	1594	1559	1524	1490	1457	1425	1393	1363	1334	1307
JD 2444270.5	3102	3204	3305	3407	3507	0	113	212	312	411	509	607	705	802	898	995	1090	1186	1281	1377	1472
1980 FEB 1.0	1632	1611	1610	1639	1707	0	1759	1723	1686	1650	1614	1578	1542	1508	1474	1441	1409	1378	1348	1319	1292
JD 2444260.5	3146	3247	3349	3450	3549	57	156	256	355	455	553	651	749	846	942	1038	1134	1230	1325	1420	1516
1980 JAN 22.0	1611	1599	1612	1660	1746	1779	1743	1706	1670	1633	1597	1561	1526	1491	1457	1424	1393	1362	1332	1304	1277
JD 2444250.5	3190	3291	3393	3494	3581	100	200	300	399	499	597	695	793	890	986	1083	1178	1274	1369	1464	1560
1980 JAN 12.0	1594	1594	1622	1690	1779	1764	1727	1690	1653	1616	1580	1544	1509	1474	1441	1408	1376	1346	1316	1289	1262
JD 2444240.5	3234	3336	3437	3537	45	144	244	344	444	543	642	740	837	934	1031	1127	1223	1318	1413	1509	1604
1980 JAN 2.0	1582	1595	1642	1729	1783	1747	1710	1673	1636	1599	1563	1527	1492	1457	1424	1391	1360	1329	1300	1273	1247
JD 2444230.5	3278	3380	3481	3576	88	188	288	389	488	587	686	784	882	979	1075	1171	1267	1363	1458	1553	1648
1979 DEC 23.0	1576	1605	1672	1772	1768	1730	1693	1655	1618	1581	1545	1509	1474	1440	1406	1374	1343	1312	1284	1257	1231
JD 2444220.5	3323	3425	3525	34	132	233	333	433	533	632	731	829	927	1024	1120	1216	1312	1408	1503	1598	1693
1979 DEC 13.0	1577	1624	1713	1787	1751	1713	1676	1638	1601	1564	1527	1491	1456	1422	1389	1356	1325	1295	1267	1240	1215
JD 2444210.5	3368	3470	3568	77	177	278	378	479	578	678	776	874	972	1069	1165	1262	1357	1453	1548	1643	1737
1979 DEC 3.0	1586	1654	1760	1771	1734	1696	1658	1620	1583	1546	1509	1473	1438	1404	1371	1339	1308	1278	1250	1223	1199
JD 2444200.5	3414	3515	0	121	222	323	424	524	624	723	822	920	1018	1115	1211	1307	1403	1499	1594	1688	1778
1979 NOV 23.0	1605	1695	0	1754	1716	1678	1640	1602	1564	1527	1491	1455	1420	1386	1353	1321	1290	1260	1232	1206	1183

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E12

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD 2444320.5	173	187	210	249	318	460	872	6631	1008	498	337	261	218	193	177	168	164	165	171	182	201
1980 MAR 22.0	490	526	576	643	731	839	945	998	996	984	964	939	908	874	838	799	760	721	683	646	610
JD 2444310.5	184	202	233	284	379	598	1496	2494	717	424	308	248	213	191	178	172	170	173	182	197	221
1980 MAR 12.0	499	542	600	677	775	887	978	999	992	976	954	927	895	860	823	784	745	707	669	633	598
JD 2444300.5	197	220	259	327	462	830	4114	1234	565	373	285	237	208	190	180	175	176	182	193	213	244
1980 MAR 2.0	511	561	627	715	822	932	996	997	986	968	944	914	881	845	808	769	731	692	655	620	586
JD 2444290.5	210	240	290	381	583	1311	3719	829	470	335	267	227	203	189	181	179	182	190	206	230	270
1980 FEB 21.0	526	583	660	757	871	969	1000	993	979	958	932	901	867	831	793	754	716	679	642	608	575
JD 2444280.5	225	262	327	454	777	2856	1518	629	404	305	251	219	199	188	183	183	188	200	219	250	301
1980 FEB 11.0	544	610	696	804	918	993	998	988	971	948	920	888	853	816	778	740	702	665	630	596	565
JD 2444270.5	241	289	374	557	1149	0	947	509	356	280	237	211	195	187	184	187	195	210	234	273	340
1980 FEB 1.0	566	641	738	853	958	0	995	982	962	937	908	874	839	802	764	726	689	652	618	585	555
JD 2444260.5	260	320	436	718	2149	1888	689	428	318	260	225	204	192	186	185	190	202	220	251	301	389
1980 JAN 22.0	591	677	784	901	987	999	990	975	953	926	895	861	825	787	750	712	675	640	606	575	545
JD 2444250.5	281	360	523	1008	8089	1071	541	370	288	242	214	197	188	185	187	195	209	233	271	334	454
1980 JAN 12.0	621	718	833	945	998	996	984	966	942	914	882	847	810	773	736	699	663	628	595	565	536
JD 2444240.5	308	412	655	1698	2396	741	444	325	262	226	204	191	185	184	188	199	217	246	294	377	547
1980 JAN 2.0	656	763	884	979	999	992	978	957	931	901	868	833	796	759	722	685	650	616	585	555	527
JD 2444230.5	340	484	883	4924	1195	563	375	289	241	212	194	185	181	183	190	203	226	262	322	434	692
1979 DEC 23.0	696	813	931	997	997	987	970	947	919	888	854	819	782	745	708	672	638	605	574	546	519
JD 2444220.5	382	590	1380	3122	780	450	323	259	221	199	186	179	178	182	191	208	236	281	358	514	956
1979 DEC 13.0	742	865	970	1000	993	980	961	936	907	875	841	805	768	731	695	660	626	594	565	537	512
JD 2444210.5	440	769	3249	1308	569	371	282	233	204	187	177	173	174	181	193	214	248	304	406	640	1593
1979 DEC 3.0	792	916	994	998	989	973	951	925	89?	862	827	791	754	718	682	648	615	584	555	528	504
JD 2444200.5	524	1138	0	796	441	312	248	211	188	175	169	167	171	179	195	220	262	333	474	867	4820
1979 NOV 23.0	846	960	0	995	982	964	941	913	882	848	813	776	740	704	669	636	604	574	546	520	499

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE - DATE

EARTH - MARS TRAJECTORY PARAMETERS M16 E12

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD 2444320.5	569	520	459	382	285	171	58	2	-4	-19	-43	-76	-116	-163	-215	-271	-330	-391	-453	-515	-575
1980 MAR 22.0	1664	1677	1707	1759	1837	1942	2058	2135	2370	2394	2412	2426	2434	2439	2439	2436	2429	2420	2408	2395	2380
JD 2444310.5	559	504	435	348	240	120	23	-0	-9	-28	-56	-92	-135	-184	-238	-296	-356	-417	-479	-540	-600
1980 MAR 12.0	1672	1695	1737	1802	1895	2011	2118	2372	2399	2421	2437	2448	2454	2457	2455	2450	2442	2432	2419	2405	2390
JD 2444300.5	546	484	406	308	191	73	4	-3	-16	-39	-70	-110	-155	-206	-262	-321	-381	-443	-505	-566	-625
1980 MAR 2.0	1686	1719	1773	1853	1960	2080	2167	2403	2427	2446	2460	2469	2473	2474	2471	2464	2455	2443	2430	2415	2399
JD 2444290.5	530	460	372	264	140	33	0	-7	-25	-51	-86	-128	-176	-229	-286	-346	-407	-469	-530	-590	-648
1980 FEB 21.0	1704	1748	1815	1909	2028	2143	2404	2431	2453	2470	2481	2488	2491	2490	2485	2477	2467	2454	2440	2424	2408
JD 2444280.5	510	432	333	214	90	8	-2	-14	-35	-65	-103	-148	-198	-253	-311	-371	-432	-494	-555	-614	-671
1980 FEB 11.0	1727	1783	1864	1973	2098	2196	2434	2459	2478	2493	2502	2507	2507	2505	2498	2489	2478	2464	2449	2433	2416
JD 2444270.5	487	399	289	162	46	0	-5	-22	-47	-80	-121	-168	-220	-276	-335	-396	-458	-519	-579	-638	-693
1980 FEB 1.0	1755	1824	1920	2041	2164	0	2462	2485	2502	2514	2521	2524	2523	2518	2511	2500	2488	2474	2458	2441	2424
JD 2444260.5	460	361	240	110	15	-1	-11	-31	-60	-97	-140	-189	-243	-300	-360	-421	-483	-544	-603	-661	-715
1980 JAN 22.0	1789	1872	1982	2112	2221	2464	2489	2509	2524	2534	2539	2540	2537	2531	2522	2511	2498	2482	2466	2449	2432
JD 2444250.5	427	317	186	61	2	-4	-19	-42	-75	-114	-160	-211	-266	-325	-385	-446	-508	-568	-627	-683	-736
1980 JAN 12.0	1830	1927	2051	2182	2263	2492	2515	2533	2545	2553	2556	2555	2551	2544	2533	2521	2506	2491	2474	2457	2439
JD 2444240.5	389	267	131	23	-0	-9	-28	-55	-90	-133	-181	-233	-290	-349	-410	-471	-532	-592	-649	-704	-756
1980 JAN 2.0	1876	1989	2124	2244	2492	2518	2539	2554	2565	2571	2572	2569	2564	2555	2543	2530	2515	2498	2481	2464	2446
JD 2444230.5	346	212	78	4	-3	-16	-38	-69	-107	-152	-202	-256	-314	-374	-435	-496	-556	-615	-672	-725	-775
1979 DEC 23.0	1930	2058	2196	2291	2520	2544	2562	2575	2583	2587	2587	2582	2575	2565	2553	2538	2522	2506	2488	2470	2453
JD 2444220.5	296	154	34	-0	-7	-25	-51	-85	-125	-172	-224	-280	-338	-399	-460	-521	-580	-638	-693	-745	-793
1979 DEC 13.0	1992	2132	2263	2520	2547	2568	2584	2595	2601	2602	2600	2595	2586	2575	2561	2546	2530	2512	2494	2476	2459
JD 2444210.5	239	97	7	-2	-14	-35	-64	-101	-145	-194	-247	-304	-363	-424	-484	-545	-604	-660	-714	-765	-811
1979 DEC 3.0	2062	2208	2316	2548	2572	2591	2604	2613	2617	2617	2613	2606	2596	2583	2569	2553	2536	2518	2500	2482	2465
JD 2444200.5	178	46	0	-6	-22	-47	-79	-119	-165	-216	-270	-328	-388	-449	-509	-569	-627	-682	-735	-784	-826
1979 NOV 23.0	2138	2280	0	2574	2596	2612	2623	2630	2632	2630	2624	2616	2605	2591	2576	2560	2542	2524	2506	2488	2473
(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E12

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

	(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD 2444320.5		318	340	368	408	475	614	1053	6089	98	99	101	102	104	107	110	113	116	120	123	128	132
1980 MAR 22.0		278	288	298	308	317	326	333	338	183	187	191	195	199	204	209	215	220	226	232	239	245
JD 2444310.5		324	349	381	429	518	731	1676	98	99	100	102	104	106	108	111	114	118	121	125	130	134
1980 MAR 12.0		285	295	305	314	323	331	337	183	186	190	194	198	203	208	213	219	224	230	237	243	250
JD 2444300.5		332	359	396	457	581	941	4075	99	100	101	103	105	107	110	113	116	120	123	128	132	137
1980 MAR 2.0		291	301	311	320	329	336	341	186	190	194	198	202	207	212	217	223	229	235	241	248	255
JD 2444290.5		340	370	415	495	678	1393	99	100	101	102	104	106	109	112	115	118	122	126	130	134	139
1980 FEB 21.0		298	307	317	326	334	340	186	190	193	197	201	206	211	216	221	227	233	239	246	252	259
JD 2444280.5		350	384	440	549	846	2821	100	101	102	104	106	108	111	113	116	120	124	128	132	136	141
1980 FEB 11.0		304	314	323	331	339	344	190	193	197	201	205	210	215	220	225	231	237	243	250	257	264
JD 2444270.5		360	402	473	631	1184	0	101	102	103	105	107	109	112	115	118	122	126	130	134	139	144
1980 FEB 1.0		310	320	329	337	343	0	193	196	200	204	209	214	219	224	229	235	242	248	255	261	269
JD 2444260.5		373	424	519	767	2104	101	102	103	104	106	109	111	114	117	120	124	128	132	136	141	146
1980 JAN 22.0		316	326	334	342	347	193	196	200	204	208	213	217	223	228	234	240	246	252	259	266	273
JD 2444250.5		389	453	589	1028	5582	101	103	104	106	108	110	113	116	119	122	126	130	134	139	144	149
1980 JAN 12.0		322	331	340	346	351	196	200	203	207	212	216	221	227	232	238	244	250	257	264	271	278
JD 2444240.5		409	493	702	1666	102	103	104	105	107	109	112	114	117	121	124	128	132	137	141	146	151
1980 JAN 2.0		328	337	345	351	196	199	203	207	211	215	220	225	231	236	242	249	255	262	269	276	283
JD 2444230.5		434	553	909	4283	103	104	105	107	109	111	113	116	119	123	126	130	135	139	144	149	154
1979 DEC 23.0		334	343	349	354	199	203	206	210	215	219	224	229	235	241	247	253	260	266	273	280	288
JD 2444220.5		470	648	1381	103	104	105	106	108	110	113	115	118	121	125	129	133	137	141	146	151	157
1979 DEC 13.0		340	348	354	199	203	206	210	214	219	223	228	234	239	245	251	258	264	271	278	285	293
JD 2444210.5		522	818	3105	104	105	106	108	110	112	114	117	120	123	127	131	135	139	144	149	154	159
1979 DEC 3.0		346	353	358	203	206	210	214	218	222	227	232	238	244	249	256	262	269	276	283	290	298
JD 2444200.5		604	1188	0	105	106	107	109	111	113	116	119	122	125	129	133	137	142	147	152	157	162
1979 NOV 23.0		351	357	0	206	209	213	217	222	226	231	237	242	248	254	260	267	274	281	288	295	303
	(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M16 E12

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., DEPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD 2444320.5 1980 MAR 22.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444310.5 1980 MAR 12.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444300.5 1980 MAR 2.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444290.5 1980 FEB 21.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444280.5 1980 FEB 11.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444270.5 1980 FEB 1.0	1524	1524	1524	1524	1524	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444260.5 1980 JAN 22.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444250.5 1980 JAN 12.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444240.5 1980 JAN 2.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444230.5 1979 DEC 23.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444220.5 1979 DEC 13.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444210.5 1979 DEC 3.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444200.5 1979 NOV 23.0	1524	1524	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524

(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)

JD2444600.5 1980 DEC 27.0 JD2444640.5 1981 FEB 5.0 JD2444680.5 1981 MAR 17.0 JD2444720.5 1981 APR 26.0 JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

M16
E12

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

	(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD 2444320.5		380	481	624	831	1133	1568	2159	2847	2850	2645	2440	2236	2035	1838	1647	1461	1282	1110	947	792	646
1980 MAR 22.0		402	481	610	798	1061	1420	1880	2394	2445	2321	2198	2077	1959	1845	1734	1628	1527	1431	1341	1256	1178
JD 2444310.5		406	527	699	947	1307	1816	2468	2975	2772	2567	2363	2160	1961	1766	1577	1394	1218	1049	889	737	595
1980 MAR 12.0		425	526	680	899	1202	1607	2103	2511	2386	2262	2140	2020	1903	1790	1682	1577	1478	1385	1297	1215	1139
JD 2444300.5		441	585	790	1087	1513	2094	2785	2897	2693	2489	2286	2086	1888	1696	1509	1329	1155	990	833	685	546
1980 MAR 2.0		458	582	763	1017	1364	1814	2329	2453	2329	2206	2084	1965	1850	1738	1631	1529	1432	1340	1254	1175	1102
JD 2444290.5		485	656	901	1253	1751	2398	3020	2819	2616	2413	2211	2012	1817	1626	1442	1265	1094	932	778	634	499
1980 FEB 21.0		501	648	859	1152	1545	2035	2523	2398	2273	2151	2030	1912	1798	1688	1582	1482	1387	1298	1214	1137	1066
JD 2444280.5		541	743	1033	1449	2021	2715	2942	2741	2538	2336	2136	1939	1746	1558	1377	1202	1035	876	726	585	454
1980 FEB 11.0		554	727	972	1307	1748	2265	2469	2344	2220	2098	1978	1861	1748	1640	1536	1437	1344	1257	1176	1101	1033
JD 2444270.5		608	848	1192	1679	2320	0	2863	2663	2461	2261	2062	1867	1676	1491	1312	1141	977	821	674	537	411
1980 FEB 1.0		618	820	1102	1484	1969	0	2417	2292	2168	2046	1927	1812	1700	1593	1491	1395	1304	1218	1139	1067	1002
JD 2444260.5		690	974	1380	1942	2639	2983	2785	2585	2385	2186	1989	1796	1608	1425	1250	1081	920	768	625	492	370
1980 JAN 22.0		693	928	1252	1685	2203	2491	2366	2241	2118	1997	1879	1765	1654	1549	1449	1354	1265	1181	1105	1035	973
JD 2444250.5		790	1125	1601	2238	2965	2905	2707	2508	2309	2111	1916	1726	1540	1361	1188	1022	865	716	577	448	333
1980 JAN 12.0		782	1054	1426	1907	2442	2442	2317	2192	2069	1949	1832	1719	1610	1506	1408	1315	1227	1146	1072	1004	946
JD 2444240.5		910	1306	1859	2560	3021	2827	2629	2431	2233	2037	1845	1656	1474	1297	1127	965	811	666	530	407	300
1980 JAN 2.0		887	1201	1625	2147	2521	2395	2269	2145	2023	1903	1787	1675	1568	1465	1368	1277	1192	1113	1040	976	923
JD 2444230.5		1055	1521	2153	2895	2942	2748	2551	2354	2158	1964	1774	1588	1408	1234	1068	909	758	617	486	368	277
1979 DEC 23.0		1009	1372	1849	2397	2475	2349	2223	2099	1977	1859	1744	1633	1527	1426	1331	1241	1158	1081	1011	950	906
JD 2444220.5		1230	1775	2479	3054	2863	2669	2473	2277	2083	1891	1703	1520	1343	1173	1009	854	707	569	443	333	275
1979 DEC 13.0		1154	1571	2097	2557	2430	2304	2178	2054	1933	1816	1702	1592	1488	1389	1295	1207	1126	1051	983	927	904
JD 2444210.5		1440	2069	2825	2974	2783	2590	2395	2201	2008	1819	1634	1453	1279	1112	952	800	657	523	402	305	369
1979 DEC 3.0		1324	1799	2360	2514	2387	2260	2135	2011	1891	1774	1661	1553	1450	1353	1261	1175	1095	1022	958	909	967
JD 2444200.5		1691	2400	0	2894	2703	2511	2317	2125	1934	1747	1564	1387	1216	1052	896	747	608	479	365	294	1498
1979 NOV 23.0		1524	2055	0	2472	2344	2217	2092	1970	1850	1734	1623	1516	1414	1318	1228	1144	1066	995	935	902	1746
	(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M16
E12

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD 2444320.5	782	962	1234	1628	2194	2987	4039	5241	5296	4966	4638	4313	3995	3683	3381	3089	2809	2542	2288	2048	1824
1980 MAR 22.0	2883	2985	3087	3189	3290	3391	3491	3582	94	193	291	389	486	583	680	776	872	968	1063	1158	1254
JD 2444310.5	831	1053	1379	1846	2510	3423	4570	5486	5158	4829	4503	4181	3865	3557	3259	2971	2696	2434	2186	1952	1734
1980 MAR 12.0	2927	3029	3131	3232	3334	3435	3534	40	137	236	335	433	530	627	724	820	916	1011	1107	1202	1297
JD 2444300.5	899	1167	1553	2103	2876	3908	5114	5350	5022	4695	4370	4051	3738	3434	3140	2857	2587	2330	2087	1859	1647
1980 MAR 2.0	2971	3073	3174	3276	3377	3478	3573	82	181	280	378	476	574	671	767	864	959	1055	1150	1246	1341
JD 2444290.5	986	1305	1760	2405	3296	4433	5542	5216	4889	4563	4241	3924	3615	3314	3025	2747	2481	2230	1993	1771	1565
1980 FEB 21.0	3014	3116	3218	3320	3421	3521	30	125	224	323	422	520	618	715	811	907	1003	1099	1194	1289	1385
JD 2444280.5	1094	1470	2005	2756	3769	4980	5410	5085	4758	4434	4114	3800	3494	3198	2913	2639	2379	2133	1901	1685	1487
1980 FEB 11.0	3058	3160	3262	3363	3464	3562	70	169	268	367	466	564	661	758	855	951	1047	1142	1238	1333	1428
JD 2444270.5	1226	1668	2293	3163	4289	0	5280	4955	4630	4307	3990	3679	3377	3085	2804	2535	2280	2040	1814	1604	1412
1980 FEB 1.0	3102	3204	3305	3407	3507	0	113	212	312	411	509	607	705	802	898	995	1090	1186	1281	1377	1472
JD 2444260.5	1384	1902	2632	3627	4843	5475	5151	4827	4503	4183	3868	3561	3262	2974	2698	2435	2185	1949	1729	1526	1343
1980 JAN 22.0	3146	3247	3349	3450	3549	57	156	256	355	455	553	651	749	846	942	1038	1134	1230	1325	1420	1516
JD 2444250.5	1572	2179	3027	4145	5407	5347	5024	4700	4378	4060	3749	3445	3150	2867	2595	2337	2092	1863	1649	1452	1279
1980 JAN 12.0	3190	3291	3393	3494	3581	100	200	300	399	499	597	695	793	890	986	1083	1178	1274	1369	1464	1560
JD 2444240.5	1797	2507	3484	4706	5542	5221	4898	4576	4256	3940	3632	3332	3041	2762	2496	2242	2003	1779	1571	1382	1223
1980 JAN 2.0	3234	3336	3437	3537	45	144	244	344	444	543	642	740	837	934	1031	1127	1223	1318	1413	1509	1604
JD 2444230.5	2064	2893	4003	5292	5417	5096	4774	4453	4135	3823	3517	3221	2935	2660	2399	2150	1916	1698	1497	1317	1183
1979 DEC 23.0	3278	3380	3481	3576	88	188	288	389	488	587	686	784	882	979	1075	1171	1267	1363	1458	1553	1648
JD 2444220.5	2384	3346	4576	5611	5293	4973	4651	4332	4016	3707	3405	3113	2831	2561	2304	2061	1833	1620	1426	1259	1180
1979 DEC 13.0	3323	3425	3525	34	132	233	333	433	533	632	731	829	927	1024	1120	1216	1312	1408	1503	1598	1693
JD 2444210.5	2764	3868	5186	5488	5170	4850	4530	4212	3899	3593	3295	3007	2729	2464	2213	1975	1752	1546	1360	1213	1336
1979 DEC 3.0	3368	3470	3568	77	177	278	378	479	578	678	776	874	972	1069	1165	1262	1357	1453	1548	1643	1737
JD 2444200.5	3215	4456	0	5366	5048	4728	4410	4094	3784	3481	3187	2903	2630	2370	2123	1891	1674	1474	1299	1196	3244
1979 NOV 23.0	3414	3515	0	121	222	323	424	524	624	723	822	920	1018	1115	1211	1307	1403	1499	1594	1688	1778
(FLT T)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

M17
E09

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444220.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671760	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.596	DEGREES
MEAN ANOM. AT EPOCH	=	338.496	DEGREES
DATE OF NODAL PASSAGE	=	2444140.126	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444220.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338693	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.403	DEGREES
ARG. OF PERIHELION	=	286.287	DEGREES
MEAN ANOM. AT EPOCH	=	141.196	DEGREES
DATE OF NODAL PASSAGE	=	2444072.525	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.061	DEGREES

M17
E09

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)
JD 2444440.5	1359	1071	838	671	552	466	400	349	308	273	244	218	194	173	154	136	121	112	156	110	117
1980 JUL 20.0	899	683	509	384	295	232	186	153	130	116	107	104	104	106	110	113	117	122	159	120	122
JD 2444430.5	1215	954	757	617	516	442	384	339	301	270	242	218	196	175	157	140	127	127	183	112	119
1980 JUL 10.0	782	588	441	336	261	207	168	140	122	112	107	107	110	114	119	125	131	143	154	134	136
JD 2444420.5	1086	858	693	574	488	422	371	330	296	267	242	219	198	179	162	146	137	260	134	115	120
1980 JUN 30.0	679	509	385	297	233	186	153	131	117	111	110	113	118	125	131	139	149	232	150	149	152
JD 2444410.5	975	780	640	539	464	407	362	325	294	267	243	222	203	185	168	156	165	326	130	118	123
1980 JUN 20.0	590	445	339	264	208	169	141	124	115	113	116	122	129	137	146	156	177	245	165	167	170
JD 2444400.5	883	717	598	511	445	395	354	321	292	268	246	226	208	192	177	172	323	180	132	123	127
1980 JUN 10.0	515	391	301	236	188	155	133	121	117	118	124	132	141	151	162	177	278	188	183	187	191
JD 2444390.5	806	665	563	488	430	385	349	319	293	271	250	232	216	201	190	207	554	165	139	130	132
1980 MAY 31.0	452	346	268	212	172	144	128	121	121	126	135	145	156	168	182	209	393	202	205	210	214
JD 2444380.5	743	622	534	469	418	378	346	318	295	275	256	240	225	213	210	355	243	167	148	139	139
1980 MAY 21.0	399	308	241	192	158	137	126	124	128	136	147	160	173	187	205	304	235	222	229	235	241
JD 2444370.5	690	587	511	454	409	374	344	320	299	280	264	249	236	228	248	936	212	176	160	151	149
1980 MAY 11.0	355	275	217	176	148	132	127	130	138	149	162	176	191	208	240	644	243	247	255	263	270
JD 2444360.5	647	558	492	442	403	371	345	323	304	288	273	261	251	250	374	321	213	189	175	166	163
1980 MAY 1.0	317	248	198	163	141	132	132	138	150	163	179	195	212	235	322	290	265	274	285	295	304
JD 2444350.5	611	535	477	433	398	370	347	328	311	297	285	274	269	289	1460	268	225	207	194	185	181
1980 APR 21.0	284	224	182	153	138	134	139	150	164	180	197	216	236	270	995	288	293	306	319	331	343
JD 2444340.5	582	516	466	427	396	372	351	335	320	308	298	291	293	392	419	267	243	228	217	209	205
1980 APR 11.0	256	205	169	148	139	141	150	164	180	198	218	239	264	341	357	311	325	341	356	372	386
JD 2444330.5	558	500	457	423	396	375	357	343	331	321	314	311	331	1121	331	282	266	255	245	238	235
1980 APR 1.0	232	188	160	145	143	150	163	180	199	219	241	265	301	797	338	343	361	380	399	418	436
JD 2444320.5	536	488	451	421	398	380	365	354	344	337	333	337	415	545	328	305	294	286	279	274	273
1980 MAR 22.0	213	176	155	147	150	162	178	198	219	242	267	296	363	441	362	379	402	425	448	471	494

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E09

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)
JD 2444440.5	229	228	228	229	229	226	222	214	204	191	177	161	144	128	112	96	78	37	-331	352	271
1980 JUL 20.0	831	820	832	867	916	974	1036	1100	1164	1226	1285	1339	1387	1427	1454	1465	1453	1404	1223	1357	1247
JD 2444430.5	222	221	223	224	225	223	218	211	200	186	171	153	134	114	92	65	19	-130	670	348	288
1980 JUL 10.0	773	775	801	845	900	961	1026	1092	1157	1220	1280	1334	1383	1423	1450	1461	1443	1366	1831	1382	1274
JD 2444420.5	214	215	218	220	221	219	215	207	195	181	164	145	123	98	68	24	-71	-519	487	339	295
1980 JUN 30.0	724	739	776	827	886	950	1017	1085	1151	1215	1275	1331	1380	1420	1447	1455	1426	1213	1592	1412	1307
JD 2444410.5	206	209	213	216	217	216	211	202	191	175	157	135	110	80	39	-31	-231	669	408	325	294
1980 JUN 20.0	683	710	755	811	875	942	1010	1079	1146	1211	1272	1328	1378	1418	1444	1447	1387	2312	1574	1447	1346
JD 2444400.5	198	202	208	212	214	212	207	198	186	170	150	126	96	59	2	-114	-549	530	357	307	288
1980 JUN 10.0	649	687	738	799	865	934	1004	1074	1142	1208	1270	1326	1376	1416	1441	1432	1266	1786	1585	1485	1390
JD 2444390.5	191	197	203	208	210	209	204	194	181	164	142	115	81	34	-46	-252	590	418	317	285	275
1980 MAY 31.0	622	668	724	789	857	928	999	1070	1140	1206	1268	1325	1375	1414	1434	1400	2527	1704	1604	1526	1439
JD 2444380.5	184	192	199	205	207	205	200	190	176	157	134	103	63	3	-116	-516	541	346	281	261	258
1980 MAY 21.0	600	652	713	780	850	923	996	1068	1138	1205	1268	1325	1375	1412	1422	1325	1894	1685	1626	1566	1490
JD 2444370.5	178	187	196	201	204	202	196	186	171	151	125	91	43	-37	-231	458	415	294	249	235	236
1980 MAY 11.0	582	639	703	773	845	919	993	1066	1136	1204	1267	1325	1374	1407	1399	2620	1758	1683	1649	1605	1542
JD 2444360.5	173	183	192	198	201	199	193	182	166	144	115	76	17	-94	-450	550	334	253	219	209	212
1980 MAY 1.0	567	628	695	767	841	916	991	1064	1136	1204	1267	1325	1372	1398	1356	1953	1716	1688	1671	1641	1590
JD 2444350.5	168	180	189	196	198	196	190	178	161	137	105	60	-15	-188	266	418	278	219	192	183	186
1980 APR 21.0	554	619	689	762	837	913	989	1063	1135	1204	1268	1324	1369	1383	2617	1762	1699	1695	1690	1672	1634
JD 2444340.5	164	176	187	193	196	194	187	174	156	130	94	39	-61	-367	561	330	237	191	168	159	161
1980 APR 11.0	544	611	683	758	834	911	988	1063	1135	1204	1268	1323	1363	1359	1997	1703	1692	1702	1707	1699	1672
JD 2444330.5	160	174	184	191	194	191	184	170	151	122	81	13	-137	-724	427	273	205	168	146	137	138
1980 APR 1.0	535	605	679	755	832	910	987	1063	1136	1204	1267	1321	1352	1799	1739	1677	1689	1708	1721	1721	1704
JD 2444320.5	157	171	182	189	192	189	181	167	145	113	65	-23	-279	569	334	233	180	148	128	119	118
1980 MAR 22.0	528	600	675	752	831	909	987	1063	1136	1205	1267	1317	1340	2046	1664	1663	1687	1713	1731	1737	1728

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

M17
E09

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

	(FLT T)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)
JD 2444440.5		-13	20	41	51	53	48	37	20	-0	-24	-48	-69	-84	-95	-100	-100	-93	-69	148	-231	-175
1980 JUL 20.0		1826	1765	1736	1736	1759	1801	1862	1940	2034	2138	2246	2349	2441	2518	2580	2628	2664	2689	2687	2715	2710
JD 2444430.5		20	47	61	66	64	54	39	17	-7	-35	-60	-79	-92	-99	-100	-94	-73	5	-535	-234	-194
1980 JUL 10.0		1749	1704	1691	1704	1739	1793	1866	1958	2064	2178	2290	2391	2477	2548	2604	2647	2679	2697	2709	2730	2726
JD 2444420.5		50	69	78	78	71	58	37	11	-18	-48	-72	-89	-99	-102	-98	-83	-38	239	-346	-236	-205
1980 JUN 30.0		1681	1653	1654	1679	1725	1792	1879	1984	2101	2220	2331	2427	2506	2569	2619	2657	2684	2659	2729	2736	2735
JD 2444410.5		75	88	91	87	76	58	32	0	-32	-61	-83	-97	-104	-103	-93	-64	37	-694	-299	-237	-213
1980 JUN 20.0		1622	1609	1623	1661	1719	1799	1900	2018	2142	2261	2367	2455	2526	2582	2626	2660	2678	2588	2728	2736	2737
JD 2444400.5		96	103	102	94	78	54	22	-13	-47	-75	-94	-104	-107	-101	-83	-30	239	-426	-278	-237	-218
1980 JUN 10.0		1571	1573	1599	1649	1721	1815	1930	2057	2183	2298	2395	2474	2537	2588	2627	2655	2626	2697	2722	2730	2733
JD 2444390.5		112	115	110	97	76	46	9	-29	-62	-87	-102	-109	-108	-97	-66	39	-743	-344	-267	-238	-222
1980 MAY 31.0		1528	1543	1582	1644	1731	1840	1966	2098	2221	2328	2416	2486	2542	2587	2622	2642	2201	2692	2710	2720	2724
JD 2444380.5		126	124	115	97	70	34	-7	-46	-76	-97	-109	-112	-107	-88	-34	210	-483	-307	-260	-238	-225
1980 MAY 21.0		1492	1519	1571	1648	1749	1871	2006	2137	2253	2350	2428	2490	2540	2580	2611	2592	2627	2678	2695	2706	2712
JD 2444370.5		136	131	117	94	60	18	-24	-61	-88	-105	-113	-113	-102	-72	26	-652	-375	-287	-255	-238	-228
1980 MAY 11.0		1462	1502	1568	1660	1775	1909	2046	2171	2278	2364	2433	2489	2534	2570	2594	1866	2630	2660	2677	2689	2697
JD 2444360.5		144	134	116	87	47	1	-41	-74	-97	-110	-115	-111	-94	-44	169	-526	-326	-274	-251	-238	-229
1980 MAY 1.0		1438	1493	1573	1680	1809	1948	2082	2199	2295	2371	2432	2482	2523	2556	2552	2521	2615	2640	2657	2670	2679
JD 2444350.5		150	136	111	76	30	-16	-56	-85	-104	-114	-115	-106	-79	8	-468	-395	-299	-265	-248	-238	-230
1980 APR 21.0		1422	1490	1586	1708	1847	1987	2114	2219	2304	2372	2426	2471	2509	2537	1776	2550	2594	2618	2635	2649	2659
JD 2444340.5		153	134	103	61	12	-33	-69	-93	-108	-115	-113	-98	-54	126	-556	-336	-281	-258	-245	-237	-231
1980 APR 11.0		1413	1497	1608	1743	1887	2022	2138	2232	2307	2367	2416	2457	2492	2503	2382	2539	2572	2594	2612	2627	2638
JD 2444330.5		153	128	92	44	-5	-47	-78	-99	-110	-114	-108	-84	-9	345	-405	-302	-269	-252	-242	-236	-231
1980 APR 1.0		1411	1511	1638	1782	1924	2050	2154	2237	2296	2358	2402	2441	2473	2246	2459	2519	2547	2569	2588	2603	2616
JD 2444320.5		150	120	77	26	-21	-59	-85	-102	-110	-111	-99	-62	85	-569	-337	-281	-258	-247	-239	-234	-230
1980 MAR 22.0		1419	1535	1674	1821	1957	2072	2164	2237	2296	2345	2386	2423	2446	2208	2455	2495	2522	2544	2563	2579	2594
	(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)

JD2444000.5	JD2444040.5	JD2444080.5	JD2444120.5	JD2444160.5
1979 MAY 7.0	1979 JUN 16.0	1979 JUL 26.0	1979 SEP 4.0	1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E09

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

	(FLT T)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)
JD 2444440.5 1980 JUL 20.0		1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639
JD 2444430.5 1980 JUL 10.0		1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571
JD 2444420.5 1980 JUN 30.0		1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
JD 2444410.5 1980 JUN 20.0		1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425
JD 2444400.5 1980 JUN 10.0		1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347
JD 2444390.5 1980 MAY 31.0		1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267
JD 2444380.5 1980 MAY 21.0		1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185
JD 2444370.5 1980 MAY 11.0		1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102
JD 2444360.5 1980 MAY 1.0		1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020
JD 2444350.5 1980 APR 21.0		941	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941
JD 2444340.5 1980 APR 11.0		866	866	866	866	866	866	866	866	866	866	866	866	866	866	866	866	866	866	866	866	866
JD 2444330.5 1980 APR 1.0		798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798
JD 2444320.5 1980 MAR 22.0		742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742
	(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E09

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)
JD 2444440.5	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368
1980 JUL 20.0	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678
JD 2444430.5	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376
1980 JUL 10.0	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717
JD 2444420.5	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383
1980 JUN 30.0	758	758	758	758	758	758	758	758	758	758	758	758	758	758	758	758	758	758	758	758	758
JD 2444410.5	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387
1980 JUN 20.0	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802
JD 2444400.5	388	388	388	388	388	388	388	388	388	388	388	388	388	388	388	388	388	388	388	388	388
1980 JUN 10.0	849	849	849	849	849	849	849	849	849	849	849	849	849	849	849	849	849	849	849	849	849
JD 2444390.5	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387
1980 MAY 31.0	899	899	899	899	899	899	899	899	899	899	899	899	899	899	899	899	899	899	899	899	899
JD 2444380.5	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382
1980 MAY 21.0	955	955	955	955	955	955	955	955	955	955	955	955	955	955	955	955	955	955	955	955	955
JD 2444370.5	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372
1980 MAY 11.0	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016
JD 2444360.5	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355
1980 MAY 1.0	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084
JD 2444350.5	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332
1980 APR 21.0	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160
JD 2444340.5	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299
1980 APR 11.0	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247
JD 2444330.5	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254
1980 APR 1.0	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345
JD 2444320.5	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
1980 MAR 22.0	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E09

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

	(FLT T)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)
JD 2444440.5		3562	3466	3370	3274	3178	3083	2987	2892	2797	2701	2605	2509	2412	2315	2217	2119	2020	1921	1821	1721	1620
1980 JUL 20.0		-1700	-1473	-1297	-1166	-1064	-981	-908	-841	-778	-716	-654	-592	-528	-461	-391	-318	-240	-157	-69	25	126
JD 2444430.5		3513	3417	3321	3225	3129	3034	2939	2843	2748	2652	2556	2460	2363	2266	2169	2070	1972	1872	1772	1672	1571
1980 JUL 10.0		-1584	-1386	-1236	-1124	-1034	-958	-890	-827	-767	-708	-649	-588	-526	-461	-393	-322	-246	-165	-77	15	115
JD 2444420.5		3465	3369	3273	3177	3081	2986	2890	2795	2700	2604	2508	2412	2315	2218	2120	2022	1924	1825	1724	1624	1523
1980 JUN 30.0		-1486	-1315	-1187	-1089	-1008	-939	-876	-816	-759	-702	-645	-586	-526	-463	-397	-328	-254	-176	-89	1	100
JD 2444410.5		3418	3321	3225	3129	3034	2938	2843	2748	2652	2557	2461	2364	2268	2171	2073	1975	1876	1776	1677	1576	1476
1980 JUN 20.0		-1404	-1258	-1147	-1060	-987	-923	-864	-807	-752	-698	-643	-586	-528	-467	-403	-335	-264	-185	-103	-13	83
JD 2444400.5		3371	3274	3178	3082	2987	2891	2796	2701	2605	2510	2414	2318	2221	2124	2026	1928	1830	1729	1630	1530	1429
1980 JUN 10.0		-1336	-1211	-1114	-1036	-969	-910	-854	-800	-748	-695	-642	-587	-530	-471	-409	-344	-276	-199	-119	-32	63
JD 2444390.5		3325	3228	3132	3036	2941	2845	2750	2654	2559	2463	2368	2271	2175	2078	1980	1882	1780	1683	1584	1483	1382
1980 MAY 31.0		-1281	-1172	-1087	-1016	-955	-899	-846	-795	-744	-693	-642	-589	-534	-477	-417	-354	-283	-213	-136	-51	40
JD 2444380.5		3279	3182	3086	2990	2895	2799	2704	2609	2513	2418	2322	2226	2129	2032	1934	1837	1736	1637	1538	1437	1337
1980 MAY 21.0		-1235	-1140	-1064	-1000	-942	-890	-839	-790	-742	-693	-643	-592	-539	-483	-425	-365	-297	-228	-154	-72	16
JD 2444370.5		3233	3137	3041	2945	2849	2754	2659	2563	2468	2372	2276	2180	2084	1987	1889	1785	1691	1592	1492	1392	1291
1980 MAY 11.0		-1198	-1114	-1045	-986	-932	-882	-834	-787	-740	-693	-645	-595	-544	-490	-434	-367	-310	-244	-172	-94	-8
JD 2444360.5		3188	3092	2996	2900	2804	2709	2614	2518	2423	2327	2232	2135	2039	1942	1846	1744	1646	1547	1447	1347	1246
1980 MAY 1.0		-1167	-1092	-1029	-974	-924	-877	-831	-785	-740	-694	-647	-599	-549	-497	-444	-383	-323	-259	-190	-115	-33
JD 2444350.5		3144	3047	2951	2855	2760	2664	2569	2474	2378	2283	2187	2091	1994	1898	1786	1700	1602	1503	1403	1302	1202
1980 APR 21.0		-1140	-1073	-1016	-965	-917	-872	-828	-784	-740	-695	-650	-603	-554	-504	-436	-393	-335	-273	-207	-135	-57
JD 2444340.5		3100	3003	2907	2811	2716	2620	2525	2429	2334	2239	2143	2047	1950	1854	1752	1656	1557	1458	1358	1258	1157
1980 APR 11.0		-1119	-1058	-1005	-957	-912	-868	-826	-783	-741	-697	-653	-607	-559	-511	-455	-403	-346	-287	-223	-154	-79
JD 2444330.5		3055	2959	2863	2767	2671	2576	2481	2385	2290	2194	2099	2003	1907	1818	1709	1612	1513	1414	1314	1214	1113
1980 APR 1.0		-1101	-1045	-995	-950	-907	-865	-824	-783	-7[illegible]	-699	-655	-610	-564	-524	-463	-412	-357	-298	-237	-171	-99
JD 2444320.5		3012	2915	2819	2723	2628	2532	2437	2342	2246	2151	2055	1959	1864	1761	1666	1568	1469	1370	1270	1170	1069
1980 MAR 22.0		-1085	-1034	-988	-945	-903	-863	-823	-783	-742	-700	-658	-614	-569	-517	-470	-419	-365	-309	-249	-185	-116
	(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E09

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)
JD 2444440.5	357	101	60	44	35	30	27	25	24	24	24	25	27	30	35	44	63	112	632	171	76
1980 JUL 20.0	989	885	744	620	526	455	403	362	331	307	287	272	259	249	241	235	231	228	226	227	230
JD 2444430.5	259	124	83	64	53	47	43	40	39	39	40	43	47	54	65	86	132	310	807	176	100
1980 JUL 10.0	949	819	685	577	496	435	389	353	326	304	287	273	261	252	245	240	236	233	232	233	236
JD 2444420.5	232	138	100	80	69	62	57	55	54	55	57	62	69	81	102	143	253	1261	410	179	116
1980 JUN 30.0	892	756	635	541	471	418	377	346	322	302	287	275	265	257	251	246	243	240	239	240	243
JD 2444410.5	219	147	113	94	82	75	71	69	69	71	75	82	94	114	149	228	517	1642	321	180	128
1980 JUN 20.0	830	700	593	512	451	404	369	341	320	303	289	278	270	263	258	254	251	249	249	250	252
JD 2444400.5	212	153	123	105	94	87	84	82	83	87	94	105	123	154	214	371	1576	672	281	181	136
1980 JUN 10.0	771	652	558	487	434	394	362	338	319	304	292	283	276	271	266	264	262	261	261	262	264
JD 2444390.5	206	158	131	115	105	99	96	96	98	104	114	130	157	205	309	669	2917	472	259	182	143
1980 MAY 31.0	717	611	529	467	421	385	358	337	320	307	297	290	284	280	277	275	274	274	275	277	280
JD 2444380.5	203	162	138	123	114	109	108	109	114	122	136	159	199	274	464	1675	974	385	244	182	149
1980 MAY 21.0	670	576	505	451	410	379	356	337	323	312	304	298	294	291	290	290	290	292	294	296	300
JD 2444370.5	200	165	144	131	124	120	120	123	130	142	162	194	251	373	770	5146	633	336	233	183	154
1980 MAY 11.0	629	547	485	438	403	375	355	339	327	318	312	308	306	305	306	306	309	312	316	320	325
JD 2444360.5	198	168	150	138	132	130	132	137	147	163	190	235	321	531	1659	1345	491	305	225	183	158
1980 MAY 1.0	594	522	468	428	397	373	356	343	333	327	322	320	320	321	324	327	332	338	344	351	358
JD 2444350.5	196	170	155	145	141	140	144	152	165	187	224	288	421	827	8631	808	413	282	219	183	162
1980 APR 21.0	565	502	455	420	393	373	359	348	341	337	335	335	337	341	342	352	360	369	378	388	399
JD 2444340.5	194	172	159	152	149	150	156	167	185	215	264	357	575	1588	1824	599	362	265	214	184	165
1980 APR 11.0	540	486	445	414	392	375	363	355	351	349	349	352	357	364	371	382	394	407	421	436	451
JD 2444330.5	193	174	163	158	157	161	169	184	208	247	315	453	851	6208	1000	487	327	252	209	184	168
1980 APR 1.0	520	472	437	411	392	379	370	364	362	363	366	372	380	393	402	417	434	452	473	495	518
JD 2444320.5	192	176	167	164	165	171	183	202	233	285	381	599	1495	2474	708	416	301	240	205	184	171
1980 MAR 22.0	503	462	432	410	394	384	378	376	376	380	387	396	408	421	439	460	483	509	538	569	603

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E09

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

	(FLT T)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)
JD 2444440.5		13	137	305	452	566	653	720	773	816	851	880	905	926	944	959	972	981	988	991	-988	-982
1980 JUL 20.0		2384	2243	2071	1928	1822	1746	1692	1653	1625	1605	1591	1581	1575	1571	1570	1569	-1568	-1569	-1570	-1570	-1570
JD 2444430.5		60	214	373	502	601	677	737	784	823	855	883	906	926	944	958	971	980	987	990	-989	-983
1980 JUL 10.0		2314	2150	1992	1870	1782	1718	1673	1641	1618	1602	1592	1585	1582	1581	-1580	-1582	-1584	-1586	-1588	-1589	-1589
JD 2444420.5		127	287	430	542	629	696	749	793	828	858	884	906	925	942	957	969	979	986	990	-989	-984
1980 JUN 30.0		2228	2064	1926	1823	1749	1696	1658	1632	1614	1603	1596	1593	-1591	-1593	-1596	-1600	-1604	-1609	-1612	-1614	-1615
JD 2444410.5		198	351	477	576	652	712	760	799	832	860	884	905	924	940	954	967	977	984	989	990	-984
1980 JUN 20.0		2140	1989	1870	1783	1722	1678	1648	1627	1614	1606	1603	-1602	-1605	-1610	-1616	-1623	-1630	-1637	-1643	-1647	-1649
JD 2444400.5		266	406	517	603	671	724	768	804	834	860	883	903	921	937	951	964	974	982	988	989	-985
1980 JUN 10.0		2058	1924	1823	1751	1700	1664	1640	1625	1616	1613	-1612	-1616	-1623	-1632	-1642	-1652	-1664	-1674	-1683	-1690	-1694
JD 2444390.5		327	452	550	626	686	734	774	807	835	860	881	901	918	934	948	960	972	980	986	989	-986
1980 MAY 31.0		1985	1869	1784	1724	1683	1654	1636	1626	1622	-1622	-1627	-1635	-1646	-1659	-1674	-1689	-1704	-1720	-1734	-1745	-1753
JD 2444380.5		380	490	577	644	698	741	778	808	835	858	879	897	914	930	944	956	968	977	984	988	-986
1980 MAY 21.0		1922	1823	1752	1703	1670	1648	1636	1631	-1630	-1636	-1645	-1658	-1675	-1693	-1714	-1736	-1758	-1780	-1801	-1818	-1832
JD 2444370.5		425	523	599	659	707	747	780	809	834	856	875	893	910	925	939	954	964	973	981	986	988
1980 MAY 11.0		1868	1784	1726	1686	1660	1645	1639	-1638	-1643	-1654	-1669	-1688	-1710	-1736	-1764	-1792	-1825	-1857	-1888	-1916	-1938
JD 2444360.5		464	550	617	671	715	751	782	808	831	852	871	888	904	919	933	947	959	969	978	984	987
1980 MAY 1.0		1822	1752	1705	1674	1655	1646	-1644	-1650	-1661	-1678	-1699	-1725	-1755	-1789	-1828	-1868	-1912	-1958	-2003	-2047	-2085
JD 2444350.5		496	572	632	680	720	753	782	806	828	848	866	883	898	913	932	941	953	965	974	982	986
1980 APR 21.0		1783	1726	1688	1665	1653	-1650	-1655	-1666	-1684	-1707	-1736	-1771	-1811	-1856	-1902	-1963	-2025	-2091	-2160	-2228	-2293
JD 2444340.5		523	590	644	688	724	754	780	803	824	843	860	876	891	906	922	935	947	959	970	979	985
1980 APR 11.0		1751	1705	1676	1661	1656	-1658	-1669	-1688	-1713	-1744	-1782	-1827	-1880	-1941	-2009	-2088	-2176	-2273	-2377	-2488	-2601
JD 2444330.5		545	605	653	693	726	754	778	800	819	837	853	869	884	895	914	927	941	953	965	975	982
1980 APR 1.0		1724	1688	1668	1660	-1661	-1671	-1689	-1715	-1749	-1790	-1840	-1899	-1968	-2053	-2143	-2254	-2381	-2528	-2695	-2883	-3090
JD 2444320.5		564	617	660	696	726	752	775	795	813	830	846	861	875	892	906	920	933	947	960	971	980
1980 MAR 22.0		1703	1677	1664	-1663	-1671	-1689	-1715	-1750	-1793	-1847	-1911	-1989	-2082	-2190	-2323	-2482	-2674	-2907	-3190	-3536	-3957
	(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E09

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)
JD 2444440.5	2261	693	469	388	347	321	302	286	272	260	248	237	227	216	206	196	187	177	168	158	149
1980 JUL 20.0	369	364	357	349	340	331	322	312	303	293	283	274	264	254	245	235	225	216	206	197	187
JD 2444430.5	1039	555	425	368	335	312	295	280	267	255	243	232	222	212	201	191	182	172	163	154	145
1980 JUL 10.0	365	359	351	343	334	325	315	305	296	286	277	267	257	247	238	228	218	209	199	190	180
JD 2444420.5	718	482	396	353	325	305	289	275	262	250	239	228	217	207	197	187	177	167	158	149	140
1980 JUN 30.0	361	354	345	337	327	318	308	299	289	279	270	260	250	240	231	221	211	202	192	183	173
JD 2444410.5	576	436	375	340	317	298	283	269	257	245	234	223	212	202	192	182	172	162	153	144	135
1980 JUN 20.0	355	348	339	330	321	311	302	292	282	273	263	253	243	234	224	214	204	195	185	176	166
JD 2444400.5	498	406	359	330	309	292	277	264	252	240	229	218	208	197	187	177	168	158	148	139	130
1980 JUN 10.0	350	342	333	324	314	305	295	285	276	266	256	246	237	227	217	207	197	188	178	169	159
JD 2444390.5	450	384	347	321	302	286	272	259	247	236	225	214	203	193	183	173	162	153	143	134	125
1980 MAY 31.0	344	336	327	317	308	298	289	279	269	259	249	240	230	220	210	200	190	181	171	161	152
JD 2444380.5	418	367	336	314	296	281	267	255	243	231	220	209	199	188	178	168	158	148	138	129	120
1980 MAY 21.0	338	330	320	311	301	292	282	272	262	252	243	233	223	213	203	193	183	174	164	154	145
JD 2444370.5	394	354	327	307	290	276	262	250	238	227	216	205	194	183	173	162	153	143	133	124	115
1980 MAY 11.0	332	323	314	305	295	285	275	265	256	246	236	226	216	206	196	186	176	167	157	147	138
JD 2444360.5	376	343	319	301	285	271	258	245	234	222	211	200	189	179	168	158	148	138	128	119	109
1980 MAY 1.0	326	317	308	298	288	278	269	259	249	239	229	219	209	199	189	179	169	159	150	140	130
JD 2444350.5	362	334	312	295	280	266	253	241	229	218	206	195	185	174	162	153	143	133	123	113	104
1980 APR 21.0	320	311	301	291	282	272	262	252	242	232	222	212	202	192	181	172	162	152	142	133	123
JD 2444340.5	351	325	306	289	275	261	248	236	224	213	202	191	180	169	158	148	138	127	117	108	98
1980 APR 11.0	314	304	295	285	275	265	255	245	235	225	215	205	195	185	175	165	155	145	135	125	116
JD 2444330.5	341	318	300	284	270	256	244	232	220	208	197	186	175	165	153	143	132	122	112	102	93
1980 APR 1.0	308	298	288	278	268	258	248	238	228	218	208	198	188	178	168	158	147	138	128	118	108
JD 2444320.5	332	311	294	279	265	252	239	227	215	204	193	181	170	159	148	137	127	116	106	96	87
1980 MAR 22.0	301	292	282	272	262	252	242	231	221	211	201	191	181	170	160	150	140	130	120	110	101
(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M17 E09

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)
JD 2444440.5 1980 JUL 20.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444430.5 1980 JUL 10.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444420.5 1980 JUN 30.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444410.5 1980 JUN 20.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444400.5 1980 JUN 10.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444390.5 1980 MAY 31.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444380.5 1980 MAY 21.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444370.5 1980 MAY 11.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444360.5 1980 MAY 1.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444350.5 1980 APR 21.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444340.5 1980 APR 11.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444330.5 1980 APR 1.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444320.5 1980 MAR 22.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772

(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E09

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)
JD 2444440.5	3420	2598	1953	1505	1202	993	845	736	654	590	539	498	464	435	412	393	378	369	415	368	374
1980 JUL 20.0	2394	1762	1261	908	668	505	395	323	276	249	234	229	229	233	238	245	252	261	335	258	261
JD 2444430.5	3009	2273	1734	1366	1114	937	810	714	641	583	536	498	465	438	416	397	383	383	448	370	375
1980 JUL 10.0	2053	1488	1068	778	579	444	354	296	261	242	234	234	239	247	256	266	278	302	325	283	287
JD 2444420.5	2643	2008	1562	1257	1045	894	782	698	632	579	536	500	469	443	421	404	394	567	390	372	377
1980 JUN 30.0	1751	1263	913	672	507	396	322	277	252	241	240	245	254	265	278	293	313	507	315	315	319
JD 2444410.5	2332	1796	1425	1170	990	859	761	686	627	578	538	504	475	450	429	414	426	690	386	375	380
1980 JUN 20.0	1493	1079	787	586	448	356	298	265	248	245	250	260	274	289	307	328	374	538	348	353	359
JD 2444400.5	2075	1626	1316	1100	946	832	746	679	625	580	543	511	484	460	441	433	683	444	389	380	383
1980 JUN 10.0	1278	928	683	515	401	326	281	258	251	254	265	280	298	319	342	374	623	401	389	398	406
JD 2444390.5	1865	1489	1229	1045	912	812	735	675	628	585	550	521	495	473	458	482	1206	425	395	386	388
1980 MAY 31.0	1100	804	598	457	363	304	271	258	258	269	285	305	329	354	385	449	933	432	439	451	462
JD 2444380.5	1694	1379	1158	1001	885	797	729	674	630	592	560	533	509	490	486	747	538	427	405	395	395
1980 MAY 21.0	952	702	528	410	333	288	267	263	272	288	310	336	365	397	441	692	513	482	497	513	527
JD 2444370.5	1556	1290	1102	966	864	787	726	677	637	603	573	548	527	514	546	2221	489	439	419	408	406
1980 MAY 11.0	828	616	470	372	312	280	270	275	291	314	341	373	407	448	525	1651	533	543	565	585	604
JD 2444360.5	1443	1218	1057	939	850	781	727	683	647	616	590	567	550	550	787	680	490	456	438	426	422
1980 MAY 1.0	725	545	423	344	298	279	279	292	315	344	378	415	457	512	741	655	590	614	642	668	692
JD 2444350.5	1352	1159	1021	918	841	780	732	693	660	633	610	591	581	618	3712	580	508	481	463	451	445
1980 APR 21.0	639	487	385	323	292	284	294	315	345	381	421	465	516	603	2676	650	662	696	731	764	795
JD 2444340.5	1277	1113	993	904	836	783	741	706	678	654	635	622	625	826	887	579	537	514	497	484	478
1980 APR 11.0	567	439	357	311	293	297	315	345	382	424	471	523	588	791	834	712	747	790	833	875	915
JD 2444330.5	1216	1076	972	895	836	790	753	723	699	680	666	660	698	2740	700	606	577	557	542	530	525
1980 APR 1.0	507	401	337	306	301	315	343	380	425	474	528	590	683	2096	782	796	845	898	951	1004	1055
JD 2444320.5	1168	1047	958	891	840	801	769	745	726	711	703	712	878	1185	693	649	628	613	601	592	589
1980 MAR 22.0	458	372	326	310	317	341	378	423	474	531	593	669	851	1067	848	896	958	1022	1088	1154	1220
(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M17 E09

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

	(FLT T)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)
JD 2444440.5		5814	4361	3213	2413	1870	1498	1240	1059	930	839	773	726	692	668	650	638	630	630	749	626	635
1980 JUL 20.0		3562	3466	3370	3274	3178	3083	2987	2892	2797	2701	2605	2509	2412	2315	2217	2119	2020	1921	1821	1721	1620
JD 2444430.5		5062	3761	2803	2144	1693	1382	1164	1011	902	825	771	732	704	685	671	663	661	685	773	653	662
1980 JUL 10.0		3513	3417	3321	3225	3129	3034	2939	2843	2748	2652	2556	2460	2363	2266	2169	2070	1972	1872	1772	1672	1571
JD 2444420.5		4393	3271	2475	1929	1552	1289	1105	975	884	820	776	745	723	709	700	696	707	1074	705	687	696
1980 JUN 30.0		3465	3369	3273	3177	3081	2986	2890	2795	2700	2604	2508	2412	2315	2218	2120	2022	1924	1825	1724	1624	1523
JD 2444410.5		3825	2875	2212	1755	1438	1216	1060	951	875	823	788	764	749	740	736	742	800	1228	733	728	738
1980 JUN 20.0		3418	3321	3225	3129	3034	2938	2843	2748	2652	2557	2461	2364	2268	2171	2073	1975	1876	1776	1677	1576	1476
JD 2444400.5		3353	2554	2000	1615	1347	1158	1027	937	875	834	808	791	782	779	783	807	1306	845	778	778	789
1980 JUN 10.0		3371	3274	3178	3082	2987	2891	2796	2701	2605	2510	2414	2318	2221	2124	2026	1928	1830	1729	1630	1530	1429
JD 2444390.5		2965	2293	1827	1502	1274	1115	1006	933	884	853	835	826	823	827	843	931	2139	856	834	838	850
1980 MAY 31.0		3325	3228	3132	3036	2941	2845	2750	2654	2559	2463	2368	2271	2175	2078	1980	1882	1780	1683	1584	1483	1382
JD 2444380.5		2646	2080	1686	1410	1218	1085	996	938	901	880	871	869	874	887	927	1439	1051	909	902	909	923
1980 MAY 21.0		3279	3182	3086	2990	2895	2799	2704	2609	2513	2418	2322	2226	2129	2032	1934	1837	1736	1637	1538	1437	1337
JD 2444370.5		2384	1906	1572	1338	1176	1067	996	952	927	916	915	921	934	962	1071	3872	1022	981	983	994	1010
1980 MAY 11.0		3233	3137	3041	2945	2849	2754	2659	2563	2468	2372	2276	2180	2084	1987	1889	1785	1691	1592	1492	1392	1291
JD 2444360.5		2169	1763	1479	1282	1148	1060	1006	975	962	960	968	983	1008	1062	1529	1335	1080	1070	1080	1094	1115
1980 MAY 1.0		3188	3092	2996	2900	2804	2709	2614	2518	2423	2327	2232	2135	2039	1942	1846	1744	1646	1547	1447	1347	1246
JD 2444350.5		1991	1646	1406	1242	1133	1065	1026	1008	1006	1014	1031	1057	1098	1220	6387	1230	1170	1177	1194	1215	1241
1980 APR 21.0		3144	3047	2951	2855	2760	2664	2569	2474	2378	2283	2187	2091	1994	1898	1786	1700	1602	1503	1403	1302	1202
JD 2444340.5		1844	1551	1350	1215	1129	1079	1056	1051	1060	1079	1106	1144	1213	1618	1721	1291	1284	1304	1330	1360	1394
1980 APR 11.0		3100	3003	2907	2811	2716	2620	2525	2429	2334	2239	2143	2047	1950	1854	1752	1656	1557	1458	1358	1258	1157
JD 2444330.5		1723	1476	1309	1201	1137	1105	1096	1104	1124	1154	1193	1250	1381	4836	1481	1401	1422	1456	1493	1534	1580
1980 APR 1.0		3055	2959	2863	2767	2671	2576	2481	2385	2289	2194	2099	2003	1907	1810	1709	1612	1513	1414	1314	1214	1113
JD 2444320.5		1625	1419	1284	1201	1157	1142	1147	1168	1200	1242	1296	1381	1729	2253	1541	1545	1586	1636	1689	1745	1809
1980 MAR 22.0		3012	2915	2819	2723	2628	2532	2437	2342	2246	2151	2055	1959	1864	1761	1666	1568	1469	1370	1270	1170	1069
	(FLT T)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

M17
E10

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444320.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671748	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.600	DEGREES
MEAN ANOM. AT EPOCH	=	77.056	DEGREES
DATE OF NODAL PASSAGE	=	2444505.378	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444320.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338719	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.405	DEGREES
ARG. OF PERIHELION	=	286.290	DEGREES
MEAN ANOM. AT EPOCH	=	193.598	DEGREES
DATE OF NODAL PASSAGE	=	2444072.522	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.062	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17 E10

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)
JD 2444440.5	117	135	162	195	234	278	329	385	447	516	592	675	768	870	985	1117	1272	1960	2270	0	0
1980 JUL 20.0	122	124	125	127	130	136	148	165	189	221	261	312	373	446	535	644	779	1727	2094	0	0
JD 2444430.5	119	136	163	196	236	282	335	394	459	532	613	702	802	915	1043	1194	1985	2291	0	0	0
1980 JUL 10.0	136	137	138	139	142	147	157	173	197	230	273	328	395	477	580	708	1736	2102	0	0	0
JD 2444420.5	120	137	163	197	238	286	341	403	472	549	635	732	841	967	1113	1291	2312	0	0	0	0
1980 JUN 30.0	152	153	154	155	157	161	170	186	210	244	290	349	424	519	639	795	2109	0	0	0	0
JD 2444410.5	123	139	164	198	240	290	347	412	485	568	661	766	886	1030	1202	2333	0	0	0	0	0
1980 JUN 20.0	170	171	173	173	175	179	188	203	227	263	313	378	464	575	720	2116	0	0	0	0	0
JD 2444400.5	127	141	165	199	242	294	353	422	500	588	690	807	944	1110	1318	0	0	0	0	0	0
1980 JUN 10.0	191	193	194	196	198	202	210	225	251	289	343	417	517	650	833	0	0	0	0	0	0
JD 2444390.5	132	144	167	201	245	298	361	433	517	613	725	856	1015	1215	0	0	0	0	0	0	0
1980 MAY 31.0	214	217	220	222	224	229	237	253	280	322	383	470	589	756	0	0	0	0	0	0	0
JD 2444380.5	139	149	171	204	248	303	369	447	537	643	768	919	1110	0	0	0	0	0	0	0	0
1980 MAY 21.0	241	245	248	251	255	261	271	288	318	366	437	540	689	0	0	0	0	0	0	0	0
JD 2444370.5	149	157	177	209	254	311	380	463	562	680	824	1004	0	0	0	0	0	0	0	0	0
1980 MAY 11.0	270	276	281	286	291	299	311	332	367	423	508	637	0	0	0	0	0	0	0	0	0
JD 2444360.5	163	169	186	218	263	322	396	486	595	730	900	0	0	0	0	0	0	0	0	0	0
1980 MAY 1.0	304	312	319	326	334	344	360	386	428	497	605	0	0	0	0	0	0	0	0	0	0
JD 2444350.5	181	185	201	231	276	338	418	517	644	800	0	0	0	0	0	0	0	0	0	0	0
1980 APR 21.0	343	353	363	373	384	398	420	453	508	597	0	0	0	0	0	0	0	0	0	0	0
JD 2444340.5	205	208	222	252	298	363	450	562	708	0	0	0	0	0	0	0	0	0	0	0	930
1980 APR 11.0	386	400	414	428	444	464	494	539	613	0	0	0	0	0	0	0	0	0	0	0	1244
JD 2444330.5	235	238	252	282	331	402	499	631	0	0	0	0	0	0	0	0	0	0	0	837	752
1980 APR 1.0	436	455	473	493	516	545	588	653	0	0	0	0	0	0	0	0	0	0	0	1167	1044
JD 2444320.5	273	278	294	326	380	460	576	0	0	0	0	0	0	0	0	0	0	0	749	672	620
1980 MAR 22.0	494	518	543	571	604	648	710	0	0	0	0	0	0	0	0	0	0	0	1088	978	891
(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E10

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

	(FLT T)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)
JD 2444440.5		271	250	239	230	221	211	200	187	172	156	139	122	104	85	68	51	35	230	233	0	0
1980 JUL 20.0		1247	1189	1164	1167	1188	1223	1265	1312	1362	1412	1463	1512	1559	1605	1648	1687	1724	783	832	0	0
JD 2444430.5		288	264	249	238	227	217	205	192	177	162	145	128	111	94	77	62	219	225	0	0	0
1980 JUL 10.0		1275	1209	1178	1176	1193	1224	1264	1309	1357	1405	1454	1501	1546	1590	1630	1667	685	732	0	0	0
JD 2444420.5		295	272	257	244	233	221	209	196	182	166	150	134	118	102	87	72	211	0	0	0	0
1980 JUN 30.0		1307	1236	1198	1189	1202	1229	1265	1308	1353	1399	1445	1491	1534	1574	1612	1646	633	0	0	0	0
JD 2444410.5		294	276	261	248	236	225	212	199	185	171	155	140	125	110	96	192	0	0	0	0	0
1980 JUN 20.0		1346	1269	1223	1207	1214	1236	1269	1308	1351	1395	1438	1481	1521	1559	1594	536	0	0	0	0	0
JD 2444400.5		288	275	263	251	239	227	215	202	188	174	160	145	131	118	105	0	0	0	0	0	0
1980 JUN 10.0		1390	1309	1255	1231	1231	1248	1276	1312	1351	1392	1433	1472	1510	1544	1575	0	0	0	0	0	0
JD 2444390.5		275	269	261	251	240	228	216	204	191	178	164	151	138	126	0	0	0	0	0	0	0
1980 MAY 31.0		1439	1356	1295	1262	1253	1264	1287	1318	1353	1391	1428	1465	1499	1530	0	0	0	0	0	0	0
JD 2444380.5		258	258	255	248	238	228	217	205	193	180	167	155	144	0	0	0	0	0	0	0	0
1980 MAY 21.0		1490	1409	1342	1299	1282	1285	1302	1328	1359	1392	1426	1459	1490	0	0	0	0	0	0	0	0
JD 2444370.5		236	242	244	241	234	226	215	205	193	182	170	159	0	0	0	0	0	0	0	0	0
1980 MAY 11.0		1542	1466	1395	1344	1318	1312	1322	1342	1368	1397	1427	1456	0	0	0	0	0	0	0	0	0
JD 2444360.5		212	221	229	231	228	221	212	203	193	182	172	0	0	0	0	0	0	0	0	0	0
1980 MAY 1.0		1590	1523	1453	1396	1360	1346	1348	1362	1382	1407	1432	0	0	0	0	0	0	0	0	0	0
JD 2444350.5		186	197	209	216	217	213	207	199	190	181	0	0	0	0	0	0	0	0	0	0	0
1980 APR 21.0		1634	1578	1512	1452	1409	1386	1380	1387	1402	1420	0	0	0	0	0	0	0	0	0	0	0
JD 2444340.5		161	172	186	197	202	202	199	193	186	0	0	0	0	0	0	0	0	0	0	0	-167
1980 APR 11.0		1673	1627	1568	1509	1462	1432	1419	1418	1427	0	0	0	0	0	0	0	0	0	0	0	3257
JD 2444330.5		138	148	162	175	184	188	187	184	0	0	0	0	0	0	0	0	0	0	0	-178	-178
1980 APR 1.0		1704	1669	1619	1564	1516	1481	1462	1455	0	0	0	0	0	0	0	0	0	0	0	3238	3241
JD 2444320.5		116	126	139	153	164	171	173	0	0	0	0	0	0	0	0	0	0	0	-186	-188	-188
1980 MAR 22.0		1728	1702	1661	1613	1566	1530	1507	0	0	0	0	0	0	0	0	0	0	0	3233	3227	3231
	(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E10

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

	(FLT T)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)
JD 2444440.5		-175	-160	-153	-149	-145	-142	-138	-135	-132	-132	-134	-139	-146	-155	-166	-178	-190	-227	-219	0	0
1980 JUL 20.0		2710	2694	2667	2627	2574	2512	2445	2381	2325	2282	2254	2239	2237	2245	2263	2290	2324	2893	2951	0	0
JD 2444430.5		-194	-178	-169	-164	-159	-155	-150	-145	-141	-139	-139	-143	-149	-158	-168	-180	-233	-227	0	0	0
1980 JUL 10.0		2726	2713	2689	2653	2604	2544	2477	2410	2350	2303	2270	2252	2247	2255	2272	2298	2838	2897	0	0	0
JD 2444420.5		-205	-190	-182	-176	-171	-166	-161	-155	-150	-146	-146	-148	-153	-161	-171	-183	-233	0	0	0	0
1980 JUN 30.0		2735	2725	2704	2673	2629	2573	2508	2440	2378	2326	2290	2268	2261	2267	2283	2309	2843	0	0	0	0
JD 2444410.5		-213	-200	-192	-186	-181	-176	-170	-165	-159	-154	-152	-154	-158	-165	-175	-237	0	0	0	0	0
1980 JUN 20.0		2737	2729	2713	2686	2647	2596	2535	2469	2405	2351	2311	2286	2277	2280	2295	2790	0	0	0	0	0
JD 2444400.5		-218	-207	-199	-193	-189	-184	-179	-173	-167	-162	-159	-160	-163	-170	-178	0	0	0	0	0	0
1980 JUN 10.0		2733	2728	2715	2693	2659	2614	2557	2494	2431	2376	2333	2305	2293	2295	2308	0	0	0	0	0	0
JD 2444390.5		-222	-212	-205	-200	-195	-191	-186	-180	-174	-169	-166	-165	-168	-174	0	0	0	0	0	0	0
1980 MAY 31.0		2724	2722	2712	2694	2666	2626	2575	2516	2455	2399	2354	2324	2310	2309	0	0	0	0	0	0	0
JD 2444380.5		-225	-217	-210	-205	-201	-196	-192	-186	-181	-175	-172	-171	-172	0	0	0	0	0	0	0	0
1980 MAY 21.0		2712	2712	2705	2691	2667	2632	2587	2533	2474	2419	2374	2342	2326	0	0	0	0	0	0	0	0
JD 2444370.5		-228	-220	-214	-209	-205	-201	-196	-192	-186	-181	-177	-175	0	0	0	0	0	0	0	0	0
1980 MAY 11.0		2697	2699	2695	2684	2665	2635	2594	2545	2490	2437	2391	2358	0	0	0	0	0	0	0	0	0
JD 2444360.5		-229	-223	-217	-213	-209	-205	-200	-196	-190	-185	-181	0	0	0	0	0	0	0	0	0	0
1980 MAY 1.0		2679	2683	2682	2674	2659	2633	2598	2553	2502	2450	2405	0	0	0	0	0	0	0	0	0	0
JD 2444350.5		-230	-225	-220	-216	-212	-208	-203	-199	-194	-189	0	0	0	0	0	0	0	0	0	0	0
1980 APR 21.0		2659	2665	2667	2662	2650	2629	2598	2557	2510	2461	0	0	0	0	0	0	0	0	0	0	0
JD 2444340.5		-231	-226	-222	-218	-214	-210	-206	-201	-197	0	0	0	0	0	0	0	0	0	0	0	233
1980 APR 11.0		2638	2646	2650	2648	2640	2622	2595	2559	2515	0	0	0	0	0	0	0	0	0	0	0	682
JD 2444330.5		-231	-227	-223	-219	-215	-212	-208	-203	0	0	0	0	0	0	0	0	0	0	0	224	231
1980 APR 1.0		2617	2626	2632	2633	2628	2614	2591	2558	0	0	0	0	0	0	0	0	0	0	0	637	662
JD 2444320.5		-230	-227	-223	-220	-217	-213	-209	0	0	0	0	0	0	0	0	0	0	0	214	221	228
1980 MAR 22.0		2594	2606	2614	2618	2615	2605	2585	0	0	0	0	0	0	0	0	0	0	0	597	619	641
	(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)

JD2444200.5 1979 NOV 23.0

JD2444240.5 1980 JAN 2.0

JD2444280.5 1980 FEB 11.0

JD2444320.5 1980 MAR 22.0

JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17 E10

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

	(FLT T)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)
JD 2444440.5 1980 JUL 20.0		1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	0	0
JD 2444430.5 1980 JUL 10.0		1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	0	0	0
JD 2444420.5 1980 JUN 30.0		1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	0	0	0	0	0
JD 2444410.5 1980 JUN 20.0		1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	0	0	0	0	0	0
JD 2444400.5 1980 JUN 10.0		1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	0	0	0	0	0	0	0
JD 2444390.5 1980 MAY 31.0		1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	0	0	0	0	0	0	0	0
JD 2444380.5 1980 MAY 21.0		1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	0	0	0	0	0	0	0	0	0
JD 2444370.5 1980 MAY 11.0		1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	0	0	0	0	0	0	0	0	0	0
JD 2444360.5 1980 MAY 1.0		1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	0	0	0	0	0	0	0	0	0	0	0
JD 2444350.5 1980 APR 21.0		941	941	941	941	941	941	941	941	941	941	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444340.5 1980 APR 11.0		866	866	866	866	866	866	866	866	866	0	0	0	0	0	0	0	0	0	0	0	866	866
JD 2444330.5 1980 APR 1.0		798	798	798	798	798	798	798	798	0	0	0	0	0	0	0	0	0	0	0	798	798	798
JD 2444320.5 1980 MAR 22.0		742	742	742	742	742	742	742	0	0	0	0	0	0	0	0	0	0	0	742	742	742	742
	(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

M17
E10

(FLT T)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)
JD 2444440.5	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	0	0
1980 JUL 20.0	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	0	0
JD 2444430.5	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376	0	0	0
1980 JUL 10.0	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717	0	0	0
JD 2444420.5	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383	0	0	0	0
1980 JUN 30.0	758	758	758	758	758	758	758	758	758	758	758	758	758	758	758	758	758	0	0	0	0
JD 2444410.5	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	0	0	0	0	0
1980 JUN 20.0	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802	0	0	0	0	0
JD 2444400.5	388	388	388	388	388	388	388	388	388	388	388	388	388	388	388	0	0	0	0	0	0
1980 JUN 10.0	849	849	849	849	849	849	849	849	849	849	849	849	849	849	849	0	0	0	0	0	0
JD 2444390.5	387	387	387	387	387	387	387	387	387	387	387	387	387	387	0	0	0	0	0	0	0
1980 MAY 31.0	899	899	899	899	899	899	899	899	899	899	899	899	899	899	0	0	0	0	0	0	0
JD 2444380.5	382	382	382	382	382	382	382	382	382	382	382	382	382	0	0	0	0	0	0	0	0
1980 MAY 21.0	955	955	955	955	955	955	955	955	955	955	955	955	955	0	0	0	0	0	0	0	0
JD 2444370.5	372	372	372	372	372	372	372	372	372	372	372	372	0	0	0	0	0	0	0	0	0
1980 MAY 11.0	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	0	0	0	0	0	0	0	0	0
JD 2444360.5	355	355	355	355	355	355	355	355	355	355	355	0	0	0	0	0	0	0	0	0	0
1980 MAY 1.0	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	0	0	0	0	0	0	0	0	0	0
JD 2444350.5	332	332	332	332	332	332	332	332	332	332	0	0	0	0	0	0	0	0	0	0	0
1980 APR 21.0	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	0	0	0	0	0	0	0	0	0	0	0
JD 2444340.5	299	299	299	299	299	299	299	299	299	0	0	0	0	0	0	0	0	0	0	0	299
1980 APR 11.0	1247	1247	1247	1247	1247	1247	1247	1247	1247	0	0	0	0	0	0	0	0	0	0	0	1247
JD 2444330.5	254	254	254	254	254	254	254	254	0	0	0	0	0	0	0	0	0	0	0	254	254
1980 APR 1.0	1345	1345	1345	1345	1345	1345	1345	1345	0	0	0	0	0	0	0	0	0	0	0	1345	1345
JD 2444320.5	198	198	198	198	198	198	198	0	0	0	0	0	0	0	0	0	0	0	198	198	198
1980 MAR 22.0	1457	1457	1457	1457	1457	1457	1457	0	0	0	0	0	0	0	0	0	0	0	1457	1457	1457
(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E10

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

	(FLT T)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)
JD 2444440.5		1620	1519	1417	1315	1214	1112	1010	908	807	706	605	505	406	307	208	111	13	3516	3420	0	0
1980 JUL 20.0		126	233	345	462	581	701	818	931	1039	1142	1240	1333	1423	1510	1598	1687	1785	-1754	-1705	0	0
JD 2444430.5		1571	1470	1368	1267	1165	1063	961	859	758	657	556	456	357	258	160	62	3564	3468	0	0	0
1980 JUL 10.0		115	222	336	455	577	700	822	939	1052	1159	1260	1356	1449	1540	1632	1730	-1780	-1730	0	0	0
JD 2444420.5		1523	1422	1320	1219	1117	1015	913	811	710	609	508	408	309	210	112	15	3516	0	0	0	0
1980 JUN 30.0		100	207	321	442	568	695	822	944	1062	1173	1278	1378	1475	1571	1670	1781	-1755	0	0	0	0
JD 2444410.5		1476	1374	1273	1171	1069	967	865	764	662	561	461	361	261	163	64	3565	0	0	0	0	0
1980 JUN 20.0		83	189	303	425	554	685	817	945	1068	1184	1294	1399	1501	1604	1715	-1781	0	0	0	0	0
JD 2444400.5		1429	1328	1226	1124	1022	920	819	717	616	515	414	314	215	116	19	0	0	0	0	0	0
1980 JUN 10.0		63	166	280	403	533	669	807	941	1071	1193	1308	1419	1528	1641	1770	0	0	0	0	0	0
JD 2444390.5		1382	1281	1180	1078	976	874	772	671	569	468	368	268	168	70	0	0	0	0	0	0	0
1980 MAY 31.0		40	141	253	375	507	647	790	932	1068	1198	1320	1438	1557	1686	0	0	0	0	0	0	0
JD 2444380.5		1337	1235	1134	1032	930	828	727	625	524	423	322	222	123	0	0	0	0	0	0	0	0
1980 MAY 21.0		16	114	223	343	475	617	766	915	1060	1198	1329	1457	1590	0	0	0	0	0	0	0	0
JD 2444370.5		1291	1190	1089	987	885	783	681	580	478	377	277	177	0	0	0	0	0	0	0	0	0
1980 MAY 11.0		-8	85	190	307	438	581	733	890	1044	1192	1335	1477	0	0	0	0	0	0	0	0	0
JD 2444360.5		1246	1145	1044	942	840	738	636	535	433	332	232	0	0	0	0	0	0	0	0	0	0
1980 MAY 1.0		-33	56	156	269	397	538	693	855	1019	1179	1335	0	0	0	0	0	0	0	0	0	0
JD 2444350.5		1202	1100	999	897	795	693	592	490	389	288	0	0	0	0	0	0	0	0	0	0	0
1980 APR 21.0		-57	28	123	231	353	491	645	811	983	1156	0	0	0	0	0	0	0	0	0	0	0
JD 2444340.5		1157	1056	955	853	751	649	547	446	345	0	0	0	0	0	0	0	0	0	0	0	834
1980 APR 11.0		-79	1	92	194	310	442	592	757	935	0	0	0	0	0	0	0	0	0	0	0	-648
JD 2444330.5		1113	1012	911	809	707	605	503	402	0	0	0	0	0	0	0	0	0	0	0	783	878
1980 APR 1.0		-99	-21	64	160	270	394	537	698	0	0	0	0	0	0	0	0	0	0	0	-649	-684
JD 2444320.5		1069	968	867	765	663	561	459	0	0	0	0	0	0	0	0	0	0	0	731	827	922
1980 MAR 22.0		-116	-41	40	132	235	352	486	0	0	0	0	0	0	0	0	0	0	0	-657	-687	-723
	(FLT T)	(120)	(110)	(100	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E10

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REF TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

	(FLT T)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)
JD 2444440.5		76	50	38	31	28	25	24	24	24	25	27	30	36	46	66	123	1006	162	76	0	0
1980 JUL 20.0		230	236	246	260	281	308	343	386	439	501	572	651	735	821	902	967	999	1001	1007	0	0
JD 2444430.5		100	72	57	49	44	41	39	39	40	43	47	55	67	90	142	363	627	170	0	0	0
1980 JUL 10.0		236	241	251	265	285	312	348	394	449	515	591	674	763	852	932	987	1000	1004	0	0	0
JD 2444420.5		116	88	73	64	58	55	54	55	57	62	70	83	105	151	280	2163	371	0	0	0	0
1980 JUN 30.0		243	248	257	270	290	318	354	402	460	530	610	699	793	884	960	999	1002	0	0	0	0
JD 2444410.5		128	101	86	77	72	69	69	71	75	83	95	116	156	245	612	1146	0	0	0	0	0
1980 JUN 20.0		252	257	265	278	297	324	361	410	472	546	631	726	824	916	984	1000	0	0	0	0	0
JD 2444400.5		136	112	98	89	84	82	83	87	94	105	124	158	225	410	2563	0	0	0	0	0	0
1980 JUN 10.0		264	269	276	288	306	333	370	420	485	563	654	755	858	948	998	0	0	0	0	0	0
JD 2444390.5		143	121	108	100	96	96	98	104	114	131	159	212	330	787	0	0	0	0	0	0	0
1980 MAY 31.0		280	284	291	302	319	344	381	432	499	582	680	787	893	977	0	0	0	0	0	0	0
JD 2444380.5		149	129	117	111	108	109	113	122	136	160	202	285	507	0	0	0	0	0	0	0	0
1980 MAY 21.0		300	304	311	321	336	361	397	448	517	605	710	823	931	0	0	0	0	0	0	0	0
JD 2444370.5		154	136	126	121	119	122	129	141	161	195	257	393	0	0	0	0	0	0	0	0	0
1980 MAY 11.0		325	331	338	347	361	384	418	469	541	634	745	865	0	0	0	0	0	0	0	0	0
JD 2444360.5		158	143	134	130	131	135	145	162	190	237	330	0	0	0	0	0	0	0	0	0	0
1980 MAY 1.0		358	365	373	383	396	417	450	500	573	671	789	0	0	0	0	0	0	0	0	0	0
JD 2444350.5		162	149	142	140	142	150	163	185	223	291	0	0	0	0	0	0	0	0	0	0	0
1980 APR 21.0		399	409	420	432	446	466	498	547	621	724	0	0	0	0	0	0	0	0	0	0	0
JD 2444340.5		165	155	150	149	154	164	182	212	263	0	0	0	0	0	0	0	0	0	0	0	150
1980 APR 11.0		451	467	482	498	516	539	571	621	698	0	0	0	0	0	0	0	0	0	0	0	2469
JD 2444330.5		168	160	157	159	166	180	204	243	0	0	0	0	0	0	0	0	0	0	0	160	157
1980 APR 1.0		518	541	565	590	616	646	686	743	0	0	0	0	0	0	0	0	0	0	0	2254	1848
JD 2444320.5		171	165	164	169	179	197	228	0	0	0	0	0	0	0	0	0	0	0	171	165	164
1980 MAR 22.0		603	639	677	716	759	807	867	0	0	0	0	0	0	0	0	0	0	0	2023	1688	1434
	(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E10

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

	(FLT T)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)
JD 2444440.5	-982	-969	-949	-920	-881	-830	-768	-695	-612	-522	-428	-332	-239	-154	-80	-26	0	1	3	0	0	
1980 JUL 20.0	-1570	-1570	-1569	-1568	-1568	1569	1570	1571	1573	1575	1576	1576	1575	1572	1570	-1568	-1576	-9999	-9999	0	0	
JD 2444430.5	-983	-971	-951	-921	-881	-828	-764	-687	-600	-505	-406	-306	-211	-125	-55	-9	0	2	0	0	0	
1980 JUL 10.0	-1589	-1589	-1587	-1585	-1583	-1581	-1580	-1580	1581	1581	1582	1582	1581	-1580	-1582	-1592	-9999	-9999	0	0	0	
JD 2444420.5	-984	-972	-953	-923	-882	-828	-761	-680	-588	-488	-384	-281	-183	-98	-32	-0	1	0	0	0	0	
1980 JUN 30.0	-1615	-1614	-1612	-1608	-1604	-1600	-1597	-1594	-1593	-1592	-1592	-1592	-1594	-1598	-1610	-1643	-9999	0	0	0	0	
JD 2444410.5	-984	-974	-955	-926	-885	-830	-760	-675	-578	-473	-363	-255	-155	-71	-13	0	0	0	0	0	0	
1980 JUN 20.0	-1649	-1648	-1645	-1640	-1634	-1627	-1621	-1616	-1612	-1610	-1610	-1612	-1618	-1632	-1665	-9999	0	0	0	0	0	
JD 2444400.5	-985	-976	-959	-931	-889	-833	-760	-672	-569	-457	-342	-229	-126	-44	-1	0	0	0	0	0	0	
1980 JUN 10.0	-1694	-1694	-1691	-1684	-1675	-1665	-1655	-1647	-1641	-1639	-1639	-1645	-1661	-1695	-1780	0	0	0	0	0	0	
JD 2444390.5	-986	-978	-962	-935	-895	-838	-763	-670	-562	-443	-320	-202	-97	-20	0	0	0	0	0	0	0	
1980 MAY 31.0	-1753	-1756	-1753	-1746	-1734	-1720	-1706	-1694	-1685	-1682	-1686	-1701	-1736	-1819	0	0	0	0	0	0	0	
JD 2444380.5	-986	-980	-966	-941	-902	-845	-769	-672	-557	-430	-299	-173	-67	0	0	0	0	0	0	0	0	
1980 MAY 21.0	-1832	-1839	-1839	-1832	-1818	-1799	-1780	-1764	-1753	-1751	-1763	-1797	-1879	0	0	0	0	0	0	0	0	
JD 2444370.5	986	-982	-970	-947	-910	-854	-776	-675	-554	-417	-276	-143	0	0	0	0	0	0	0	0	0	
1980 MAY 11.0	-1936	-1953	-1959	-1955	-1940	-1918	-1893	-1872	-1860	-1863	-1894	-1976	0	0	0	0	0	0	0	0	0	
JD 2444360.5	987	-984	-974	-953	-918	-864	-786	-681	-552	-405	-252	0	0	0	0	0	0	0	0	0	0	
1980 MAY 1.0	-2085	-2115	-2133	-2136	-2125	-2102	-2073	-2048	-2039	-2061	-2144	0	0	0	0	0	0	0	0	0	0	
JD 2444350.5	986	-984	-977	-959	-927	-874	-797	-690	-553	-394	0	0	0	0	0	0	0	0	0	0	0	
1980 APR 21.0	-2293	-2349	-2392	-2417	-2421	-2405	-2380	-2361	-2372	-2459	0	0	0	0	0	0	0	0	0	0	0	
JD 2444340.5	985	-985	-979	-964	-934	-885	-809	-700	-555	0	0	0	0	0	0	0	0	0	0	0	0	978
1980 APR 11.0	-2601	-2710	-2806	-2882	-2932	-2956	-2967	-3000	-3126	0	0	0	0	0	0	0	0	0	0	0	0	-9999
JD 2444330.5	982	986	-981	-968	-942	-895	-820	-709	0	0	0	0	0	0	0	0	0	0	0	0	995	978
1980 APR 1.0	-3090	-3311	-3538	-3759	-3966	-4165	-4399	-4813	0	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999
JD 2444320.5	980	985	-983	-972	-947	-902	-828	0	0	0	0	0	0	0	0	0	0	0	0	0	1007	996	980
1980 MAR 22.0	-3957	-4473	-5104	-5889	-6914	-8458	-9999	0	0	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999
	(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

M17
E10

(FLT T)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)
JD 2444440.5	149	141	132	124	116	108	101	94	87	81	75	69	64	59	54	49	45	7795	4362	0	0
1980 JUL 20.0	187	178	169	160	151	142	133	125	117	109	101	94	87	80	73	66	59	171	156	0	0
JD 2444430.5	145	136	127	119	111	103	96	89	82	76	70	65	59	54	49	44	9999	6046	0	0	0
1980 JUL 10.0	180	171	162	153	144	135	126	118	110	102	95	87	80	73	66	59	170	156	0	0	0
JD 2444420.5	140	131	122	114	106	98	91	84	78	71	65	60	55	49	44	40	9740	0	0	0	0
1980 JUN 30.0	173	164	155	146	137	128	120	111	103	95	88	80	73	66	59	52	156	0	0	0	0
JD 2444410.5	135	126	117	109	101	94	86	79	73	67	61	55	50	45	40	9999	0	0	0	0	0
1980 JUN 20.0	166	157	148	139	130	121	113	104	96	88	81	73	66	59	52	156	0	0	0	0	0
JD 2444400.5	130	121	112	104	96	89	81	74	68	62	56	50	45	40	34	0	0	0	0	0	0
1980 JUN 10.0	159	150	141	132	123	114	106	97	89	82	74	67	59	52	45	0	0	0	0	0	0
JD 2444390.5	125	116	107	99	91	83	76	69	63	57	51	45	40	34	0	0	0	0	0	0	0
1980 MAY 31.0	152	143	133	124	116	107	98	90	82	75	67	59	52	45	0	0	0	0	0	0	0
JD 2444380.5	120	111	102	94	86	78	71	64	58	52	46	40	34	0	0	0	0	0	0	0	0
1980 MAY 21.0	145	136	126	117	108	100	91	83	75	67	60	52	45	0	0	0	0	0	0	0	0
JD 2444370.5	115	106	97	89	81	73	66	59	52	46	40	35	0	0	0	0	0	0	0	0	0
1980 MAY 11.0	138	128	119	110	101	93	84	76	68	60	53	45	0	0	0	0	0	0	0	0	0
JD 2444360.5	109	100	92	83	75	68	60	54	47	41	35	0	0	0	0	0	0	0	0	0	0
1980 MAY 1.0	130	121	112	103	94	85	77	69	61	53	45	0	0	0	0	0	0	0	0	0	0
JD 2444350.5	104	95	86	78	70	62	55	48	42	35	0	0	0	0	0	0	0	0	0	0	0
1980 APR 21.0	123	114	104	95	86	78	69	61	53	46	0	0	0	0	0	0	0	0	0	0	0
JD 2444340.5	98	89	80	72	64	56	49	42	36	0	0	0	0	0	0	0	0	0	0	0	46
1980 APR 11.0	116	106	97	88	79	70	62	54	46	0	0	0	0	0	0	0	0	0	0	0	52
JD 2444330.5	93	83	75	66	58	51	43	37	0	0	0	0	0	0	0	0	0	0	0	44	53
1980 APR 1.0	108	99	89	80	71	63	54	46	0	0	0	0	0	0	0	0	0	0	0	51	60
JD 2444320.5	87	77	68	60	52	45	37	0	0	0	0	0	0	0	0	0	0	0	42	51	61
1980 MAR 22.0	101	91	82	73	64	55	47	0	0	0	0	0	0	0	0	0	0	0	50	59	69
(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17 E10

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)
JD 2444440.5 1980 JUL 20.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0
JD 2444430.5 1980 JUL 10.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0
JD 2444420.5 1980 JUN 30.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0
JD 2444410.5 1980 JUN 20.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0
JD 2444400.5 1980 JUN 10.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0
JD 2444390.5 1980 MAY 31.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0
JD 2444380.5 1980 MAY 21.0	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0
JD 2444370.5 1980 MAY 11.0	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0
JD 2444360.5 1980 MAY 1.0	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0
JD 2444350.5 1980 APR 21.0	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0
JD 2444340.5 1980 APR 11.0	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524
JD 2444330.5 1980 APR 1.0	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524
JD 2444320.5 1980 MAR 22.0	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524

(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)

JD2444200.5 1979 NOV 23.0 JD2444240.5 1980 JAN 2.0 JD2444280.5 1980 FEB 11.0 JD2444320.5 1980 MAR 22.0 JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

M17
E10

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)
JD 2444440.5	374	392	421	464	523	599	695	811	950	1113	1302	1517	1762	2040	2360	2730	3170	5168	6076	0	0
1980 JUL 20.0	261	264	266	269	276	288	311	347	401	478	580	712	878	1083	1336	1649	2042	4841	5933	0	0
JD 2444430.5	375	393	422	466	527	606	707	830	978	1152	1354	1587	1854	2163	2522	2949	5241	6138	0	0	0
1980 JUL 10.0	287	289	291	294	299	310	331	367	422	502	611	755	939	1171	1464	1835	4869	5955	0	0	0
JD 2444420.5	377	394	423	468	530	613	719	850	1007	1194	1413	1666	1961	2307	2720	3225	6199	0	0	0	0
1980 JUN 30.0	319	322	324	326	330	340	360	395	452	536	655	814	1022	1290	1636	2089	5977	0	0	0	0
JD 2444410.5	380	395	424	469	533	620	731	870	1039	1240	1478	1758	2088	2484	2970	6261	0	0	0	0	0
1980 JUN 20.0	359	362	365	367	371	380	400	435	494	585	715	894	1133	1449	1871	5998	0	0	0	0	0
JD 2444400.5	383	397	426	471	537	627	744	892	1074	1293	1555	1867	2244	2709	3303	0	0	0	0	0	0
1980 JUN 10.0	406	411	415	418	422	432	452	489	552	651	797	1002	1284	1668	2200	0	0	0	0	0	0
JD 2444390.5	388	401	428	473	541	635	759	918	1115	1355	1647	2002	2443	3008	0	0	0	0	0	0	0
1980 MAY 31.0	462	469	475	480	486	497	519	560	629	741	908	1150	1491	1975	0	0	0	0	0	0	0
JD 2444380.5	395	407	433	478	547	645	778	949	1164	1431	1762	2176	2710	0	0	0	0	0	0	0	0
1980 MAY 21.0	527	538	547	555	564	578	604	651	730	859	1057	1351	1781	0	0	0	0	0	0	0	0
JD 2444370.5	406	416	440	485	556	660	802	988	1227	1529	1914	2413	0	0	0	0	0	0	0	0	0
1980 MAY 11.0	604	619	632	644	658	678	710	767	862	1017	1259	1630	0	0	0	0	0	0	0	0	0
JD 2444360.5	422	430	453	498	571	681	835	1041	1311	1661	2123	0	0	0	0	0	0	0	0	0	0
1980 MAY 1.0	692	714	733	751	772	800	843	914	1033	1227	1538	0	0	0	0	0	0	0	0	0	0
JD 2444350.5	445	451	473	518	595	714	883	1116	1425	1849	0	0	0	0	0	0	0	0	0	0	0
1980 APR 21.0	795	824	852	879	910	950	1009	1103	1258	1514	0	0	0	0	0	0	0	0	0	0	0
JD 2444340.5	478	483	505	552	635	765	957	1228	1604	0	0	0	0	0	0	0	0	0	0	0	1460
1980 APR 11.0	916	954	992	1031	1076	1134	1218	1349	1561	0	0	0	0	0	0	0	0	0	0	0	3412
JD 2444330.5	525	530	554	606	698	848	1073	1402	0	0	0	0	0	0	0	0	0	0	0	1204	975
1980 APR 1.0	1055	1107	1159	1215	1280	1365	1487	1675	0	0	0	0	0	0	0	0	0	0	0	3183	2820
JD 2444320.5	589	598	627	689	800	981	1261	0	0	0	0	0	0	0	0	0	0	0	967	763	629
1980 MAR 22.0	1220	1288	1359	1439	1534	1660	1843	0	0	0	0	0	0	0	0	0	0	0	2950	2628	2370

(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E10

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

	(FLT T)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)
JD 2444440.5		635	655	687	733	798	887	1005	1158	1352	1591	1882	2229	2640	3124	3696	4379	5213	9999	9999	0	0
1980 JUL 20.0		1620	1519	1417	1315	1214	1112	1010	908	807	706	605	505	406	307	208	111	13	3516	3420	0	0
JD 2444430.5		662	682	713	760	826	916	1038	1197	1400	1654	1966	2342	2794	3334	3986	4784	9999	9999	0	0	0
1980 JUL 10.0		1571	1470	1368	1267	1165	1063	961	859	758	657	556	456	357	258	160	62	3564	3468	0	0	0
JD 2444420.5		696	716	747	794	860	953	1079	1245	1459	1730	2067	2480	2983	3597	4356	5315	9999	0	0	0	0
1980 JUN 30.0		1523	1422	1320	1219	1117	1015	913	811	710	609	508	408	309	210	112	15	3516	0	0	0	0
JD 2444410.5		738	758	789	836	904	1000	1131	1305	1533	1825	2193	2652	3221	3934	4841	9999	0	0	0	0	0
1980 JUN 20.0		1476	1374	1273	1171	1069	967	865	764	662	561	461	361	261	163	64	3565	0	0	0	0	0
JD 2444400.5		789	809	840	889	959	1059	1196	1382	1626	1945	2352	2870	3528	4377	5503	0	0	0	0	0	0
1980 JUN 10.0		1429	1328	1226	1124	1022	920	819	717	616	515	414	314	215	116	19	0	0	0	0	0	0
JD 2444390.5		850	870	903	953	1027	1132	1279	1478	1744	2096	2555	3152	3934	4983	0	0	0	0	0	0	0
1980 MAY 31.0		1382	1281	1180	1078	976	874	772	671	569	468	368	268	168	70	0	0	0	0	0	0	0
JD 2444380.5		923	945	980	1032	1111	1224	1382	1599	1895	2291	2819	3527	4491	0	0	0	0	0	0	0	0
1980 MAY 21.0		1337	1235	1134	1032	930	828	727	625	524	423	322	222	123	0	0	0	0	0	0	0	0
JD 2444370.5		1010	1035	1072	1129	1214	1337	1512	1755	2089	2546	3173	4043	0	0	0	0	0	0	0	0	0
1980 MAY 11.0		1291	1190	1089	987	885	783	681	580	478	377	277	177	0	0	0	0	0	0	0	0	0
JD 2444360.5		1115	1143	1186	1249	1343	1481	1678	1955	2344	2888	3661	0	0	0	0	0	0	0	0	0	0
1980 MAY 1.0		1246	1145	1044	942	840	738	636	535	433	332	232	0	0	0	0	0	0	0	0	0	0
JD 2444350.5		1241	1275	1325	1397	1505	1663	1892	2219	2687	3363	0	0	0	0	0	0	0	0	0	0	0
1980 APR 21.0		1202	1100	999	897	795	693	592	490	389	288	0	0	0	0	0	0	0	0	0	0	0
JD 2444340.5		1394	1437	1497	1583	1711	1900	2175	2576	3165	0	0	0	0	0	0	0	0	0	0	0	4872
1980 APR 11.0		1157	1056	955	853	751	649	547	446	345	0	0	0	0	0	0	0	0	0	0	0	834
JD 2444330.5		1580	1637	1712	1820	1979	2213	2560	3077	0	0	0	0	0	0	0	0	0	0	0	4387	3796
1980 APR 1.0		1113	1012	911	809	707	605	503	402	0	0	0	0	0	0	0	0	0	0	0	783	878
JD 2444320.5		1809	1886	1987	2128	2334	2641	3103	0	0	0	0	0	0	0	0	0	0	0	0	3917	3391	2999
1980 MAR 22.0		1069	968	867	765	663	561	459	0	0	0	0	0	0	0	0	0	0	0	0	731	827	922
	(FLT T)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)

JD2444200.5 1979 NOV 23.0

JD2444240.5 1980 JAN 2.0

JD2444280.5 1980 FEB 11.0

JD2444320.5 1980 MAR 22.0

JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

M17
E11

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444460.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671732	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.607	DEGREES
MEAN ANOM. AT EPOCH	=	215.040	DEGREES
DATE OF NODAL PASSAGE	=	2444505.373	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444460.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338754	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.408	DEGREES
ARG. OF PERIHELION	=	286.294	DEGREES
MEAN ANOM. AT EPOCH	=	266.961	DEGREES
DATE OF NODAL PASSAGE	=	2444072.518	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.063	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E11

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	40	30	20	10	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160
JD 2444440.5	0	0	0	0	0	0	0	0	0	0	1717	1483	1303	1160	1044	952	868	802	746	699	660
1980 JUL 20.0	0	0	0	0	0	0	0	0	0	0	1782	1509	1295	1122	978	856	750	659	580	509	447
JD 2444430.5	0	0	0	0	0	0	0	0	0	1661	1440	1270	1134	1024	946	857	792	738	692	655	624
1980 JUL 10.0	0	0	0	0	0	0	0	0	0	1749	1488	1282	1114	974	865	752	662	584	514	452	396
JD 2444420.5	0	0	0	0	0	0	0	0	1599	1392	1232	1104	1000	916	874	780	727	684	647	618	594
1980 JUN 30.0	0	0	0	0	0	0	0	0	1712	1462	1265	1103	968	855	766	664	587	518	457	402	353
JD 2444410.5	0	0	0	0	0	0	0	1532	1336	1189	1070	972	892	857	770	716	673	639	610	587	569
1980 JUN 20.0	0	0	0	0	0	0	0	1670	1433	1244	1090	960	849	774	667	589	522	461	407	358	314
JD 2444400.5	0	0	0	0	0	0	1458	1279	1142	1031	941	866	807	873	703	662	628	600	578	561	550
1980 JUN 10.0	0	0	0	0	0	0	1623	1399	1220	1073	949	842	753	725	592	525	465	411	363	319	281
JD 2444390.5	0	0	0	0	0	1380	1215	1089	988	905	836	779	778	700	648	616	589	568	552	540	534
1980 MAY 31.0	0	0	0	0	0	1571	1361	1193	1053	935	833	745	695	597	527	469	416	368	324	286	253
JD 2444380.5	0	0	0	0	1296	1147	1032	941	866	803	751	714	1040	637	602	576	556	541	530	523	522
1980 MAY 21.0	0	0	0	0	1515	1318	1160	1030	918	822	737	667	791	530	472	419	372	329	290	257	230
JD 2444370.5	0	0	0	1209	1073	971	890	823	766	719	681	702	647	588	562	543	528	518	512	510	514
1980 MAY 11.0	0	0	0	1454	1271	1125	1003	899	807	727	657	625	543	474	423	376	333	295	261	232	211
JD 2444360.5	0	0	1118	996	906	834	776	726	685	650	630	1450	579	547	528	515	505	499	497	500	509
1980 MAY 1.0	0	0	1388	1220	1085	973	876	790	715	648	593	1027	478	425	379	337	299	265	235	211	196
JD 2444350.5	0	1024	916	837	775	725	683	647	616	594	629	620	533	513	499	490	485	483	486	493	507
1980 APR 21.0	0	1318	1165	1042	939	849	770	700	636	581	560	507	428	382	341	303	269	238	213	195	187
JD 2444340.5	930	834	766	713	671	636	606	581	560	555	1279	530	497	483	475	470	468	471	478	490	508
1980 APR 11.0	1244	1106	995	901	820	747	682	623	570	528	925	435	384	344	307	273	242	215	195	183	183
JD 2444330.5	752	693	649	614	586	562	542	525	516	5[illegible]	630	484	466	458	454	453	455	461	472	489	512
1980 APR 1.0	1044	944	860	787	721	662	607	557	514	502	496	387	346	309	276	246	218	196	180	175	184
JD 2444320.5	620	583	556	534	516	501	489	480	486	946	491	450	440	436	436	438	444	454	469	490	520
1980 MAR 22.0	891	816	751	692	639	589	543	501	469	704	400	348	312	279	249	222	198	180	170	172	189

(FLT T)	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E11

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)
JD 2444440.5	0	0	0	0	0	0	0	0	0	0	65	85	106	126	137	234	210	220	230	237	239
1980 JUL 20.0	0	0	0	0	0	0	0	0	0	0	161	212	270	336	409	458	553	638	724	813	902
JD 2444430.5	0	0	0	0	0	0	0	0	0	36	55	76	96	111	51	212	212	223	233	240	241
1980 JUL 10.0	0	0	0	0	0	0	0	0	0	97	144	199	262	331	420	459	546	632	719	808	898
JD 2444420.5	0	0	0	0	0	0	0	0	8	26	45	66	83	80	304	208	214	226	236	242	244
1980 JUN 30.0	0	0	0	0	0	0	0	0	36	80	132	191	256	333	309	455	541	626	714	803	894
JD 2444410.5	0	0	0	0	0	0	0	-19	-3	15	35	54	62	-45	224	206	216	228	238	245	247
1980 JUN 20.0	0	0	0	0	0	0	0	3577	18	66	122	185	255	351	353	450	535	622	710	799	890
JD 2444400.5	0	0	0	0	0	0	-46	-31	-13	5	24	37	20	390	207	206	218	230	240	247	249
1980 JUN 10.0	0	0	0	0	0	0	3520	3558	4	57	116	182	262	85	356	446	531	617	706	796	887
JD 2444390.5	0	0	0	0	0	-71	-57	-41	-23	-5	10	11	-123	243	200	206	219	232	243	249	252
1980 MAY 31.0	0	0	0	0	0	3466	3501	3543	3593	50	113	185	285	241	355	442	527	614	702	793	884
JD 2444380.5	0	0	0	0	-94	-83	-68	-52	-34	-18	-9	-39	423	210	197	207	221	234	245	252	254
1980 MAY 21.0	0	0	0	0	3415	3446	3486	3532	3586	46	113	195	3335	257	353	439	524	611	700	790	881
JD 2444370.5	0	0	0	-116	-106	-94	-79	-62	-46	-34	-40	-187	275	195	195	207	222	236	247	254	256
1980 MAY 11.0	0	0	0	3368	3395	3431	3474	3525	3581	45	118	223	116	261	351	436	521	608	697	787	878
JD 2444360.5	0	0	-135	-128	-118	-104	-89	-74	-60	-56	-98	294	218	188	194	208	223	237	249	256	259
1980 MAY 1.0	0	0	3325	3347	3379	3419	3466	3520	3580	48	132	3008	156	263	349	433	518	605	694	785	875
JD 2444350.5	0	-153	-147	-139	-128	-115	-100	-87	-79	-91	-241	319	194	183	193	209	225	239	250	258	260
1980 APR 21.0	0	3287	3304	3331	3367	3410	3461	3517	3581	56	164	3569	168	263	347	431	516	603	692	782	872
JD 2444340.5	-167	-164	-158	-149	-138	-125	-112	-102	-104	-154	-683	234	181	181	193	210	226	240	252	259	262
1980 APR 11.0	3257	3268	3289	3319	3358	3405	3458	3518	3587	74	3419	51	174	263	346	429	514	601	690	779	869
JD 2444330.5	-178	-174	-168	-159	-148	-137	-126	-123	-142	-292	373	197	173	179	193	210	227	242	253	261	264
1980 APR 1.0	3241	3254	3278	3311	3353	3402	3459	3522	3598	110	3388	75	177	262	345	428	512	599	687	776	865
JD 2444320.5	-188	-184	-178	-169	-159	-150	-144	-151	-206	-674	260	177	168	178	194	211	228	243	254	262	265
1980 MAR 22.0	3231	3246	3272	3307	3351	3403	3462	3531	19	38	3539	87	179	262	344	427	511	597	685	773	861

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

M17
E11

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)
JD 2444440.5	0	0	0	0	0	0	0	0	0	0	206	199	192	187	187	128	150	144	135	123	109
1980 JUL 20.0	0	0	0	0	0	0	0	0	0	0	1278	1312	1343	1372	1404	1414	1453	1485	1521	1560	1605
JD 2444430.5	0	0	0	0	0	0	0	0	0	221	215	210	206	206	252	153	159	153	144	132	116
1980 JUL 10.0	0	0	0	0	0	0	0	0	0	1215	1249	1281	1311	1342	1398	1386	1422	1457	1495	1539	1590
JD 2444420.5	0	0	0	0	0	0	0	0	234	229	225	222	222	235	80	166	168	162	153	140	122
1980 JUN 30.0	0	0	0	0	0	0	0	0	1151	1186	1219	1250	1281	1317	1310	1357	1392	1430	1472	1521	1580
JD 2444410.5	0	0	0	0	0	0	0	243	240	237	235	235	242	322	152	175	176	170	160	146	126
1980 JUN 20.0	0	0	0	0	0	0	0	1087	1123	1156	1188	1218	1252	1327	1288	1327	1365	1406	1452	1508	1574
JD 2444400.5	0	0	0	0	0	0	249	248	246	245	246	251	277	-17	172	184	183	177	166	150	128
1980 JUN 10.0	0	0	0	0	0	0	1024	1060	1094	1125	1156	1188	1228	1231	1261	1299	1339	1384	1436	1499	1575
JD 2444390.5	0	0	0	0	0	253	253	253	253	254	259	274	375	134	183	191	189	182	171	153	127
1980 MAY 31.0	0	0	0	0	0	961	998	1031	1063	1094	1125	1159	1244	1193	1233	1272	1315	1365	1424	1495	1584
JD 2444380.5	0	0	0	0	254	255	256	258	260	265	275	313	-162	166	192	197	195	187	174	154	123
1980 MAY 21.0	0	0	0	0	900	936	970	1001	1032	1062	1094	1137	1221	1167	1206	1247	1294	1349	1416	1498	1600
JD 2444370.5	0	0	0	252	255	257	260	263	268	277	299	413	95	181	198	202	199	191	176	152	116
1980 MAY 11.0	0	0	0	841	876	909	940	971	1000	1031	1065	1151	1105	1140	1180	1224	1276	1338	1414	1509	1624
JD 2444360.5	0	0	248	252	256	260	264	269	277	293	341	-238	147	191	203	206	203	193	176	148	105
1980 MAY 1.0	0	0	785	818	850	881	910	939	968	1000	1042	1333	1077	1114	1156	1204	1262	1332	1419	1527	1656
JD 2444350.5	0	241	247	252	257	262	268	276	289	318	440	32	169	197	207	209	205	194	174	140	91
1980 APR 21.0	0	732	763	793	823	851	880	908	937	970	1048	1030	1050	1069	1134	1187	1252	1332	1432	1553	1693
JD 2444340.5	233	240	246	251	257	264	272	284	305	361	567	114	181	202	210	211	206	193	169	129	75
1980 APR 11.0	682	711	739	767	795	822	848	876	906	945	1587	993	1025	1066	1115	1174	1247	1339	1452	1587	1733
JD 2444330.5	231	238	244	251	258	267	278	295	330	457	-56	146	188	205	212	213	206	190	161	115	58
1980 APR 1.0	662	688	714	740	766	791	817	844	875	941	978	965	1001	1045	1099	1166	1249	1353	1480	1625	1773
JD 2444320.5	228	235	243	250	259	270	285	311	373	657	67	161	192	206	213	213	205	185	149	99	42
1980 MAR 22.0	641	665	688	712	736	760	786	813	847	1320	918	940	979	1027	1087	1162	1257	1375	1515	1666	1807

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M17 E11

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)
JD 2444440.5 1980 JUL 20.0	0	0	0	0	0	0	0	0	0	0	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639
JD 2444430.5 1980 JUL 10.0	0	0	0	0	0	0	0	0	0	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571
JD 2444420.5 1980 JUN 30.0	0	0	0	0	0	0	0	0	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
JD 2444410.5 1980 JUN 20.0	0	0	0	0	0	0	0	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425
JD 2444400.5 1980 JUN 10.0	0	0	0	0	0	0	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347
JD 2444390.5 1980 MAY 31.0	0	0	0	0	0	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267
JD 2444380.5 1980 MAY 21.0	0	0	0	0	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185
JD 2444370.5 1980 MAY 11.0	0	0	0	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102
JD 2444360.5 1980 MAY 1.0	0	0	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020
JD 2444350.5 1980 APR 21.0	0	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941
JD 2444340.5 1980 APR 11.0	865	865	865	865	865	865	865	865	865	865	865	865	865	865	865	865	865	865	865	865	865
JD 2444330.5 1980 APR 1.0	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798
JD 2444320.5 1980 MAR 22.0	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)

JD2444400.5 1980 JUN 10.0 JD2444440.5 1980 JUL 20.0 JD2444480.5 1980 AUG 29.0 JD2444520.5 1980 OCT 8.0 JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E11

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)
JD 2444440.5	0	0	0	0	0	0	0	0	0	0	368	368	368	368	368	368	368	368	368	368	368
1980 JUL 20.0	0	0	0	0	0	0	0	0	0	0	678	678	678	678	678	678	678	678	678	678	678
JD 2444430.5	0	0	0	0	0	0	0	0	0	376	376	376	376	376	376	376	376	376	376	376	376
1980 JUL 10.0	0	0	0	0	0	0	0	0	0	717	717	717	717	717	717	717	717	717	717	717	717
JD 2444420.5	0	0	0	0	0	0	0	0	383	383	383	383	383	383	383	383	383	383	383	383	383
1980 JUN 30.0	0	0	0	0	0	0	0	0	758	758	758	758	758	758	758	758	758	758	758	758	758
JD 2444410.5	0	0	0	0	0	0	0	387	387	387	387	387	387	387	387	387	387	387	387	387	387
1980 JUN 20.0	0	0	0	0	0	0	0	802	802	802	802	802	802	802	802	802	802	802	802	802	802
JD 2444400.5	0	0	0	0	0	0	388	388	388	388	388	388	388	388	388	388	388	388	388	388	388
1980 JUN 10.0	0	0	0	0	0	0	849	849	849	849	849	849	849	849	849	849	849	849	849	849	849
JD 2444390.5	0	0	0	0	0	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387
1980 MAY 31.0	0	0	0	0	0	899	899	899	899	899	899	899	899	899	899	899	899	899	899	899	899
JD 2444380.5	0	0	0	0	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382
1980 MAY 21.0	0	0	0	0	955	955	955	955	955	955	955	955	955	955	955	955	955	955	955	955	955
JD 2444370.5	0	0	0	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372
1980 MAY 11.0	0	0	0	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016
JD 2444360.5	0	0	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355
1980 MAY 1.0	0	0	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084
JD 2444350.5	0	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332
1980 APR 21.0	0	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160
JD 2444340.5	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299
1980 APR 11.0	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247
JD 2444330.5	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254
1980 APR 1.0	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345
JD 2444320.5	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
1980 MAR 22.0	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)

JD2444400.5
1980 JUN 10.0

JD2444440.5
1980 JUL 20.0

JD2444480.5
1980 AUG 29.0

JD2444520.5
1980 OCT 8.0

JD2444560.5
1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E11

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)
JD 2444440.5	0	0	0	0	0	0	0	0	0	0	1331	1429	1528	1627	1726	1826	1927	2028	2129	2231	2333
1980 JUL 20.0	0	0	0	0	0	0	0	0	0	0	-763	-814	-867	-921	-978	-1036	-1095	-1155	-1216	-1278	-1341
JD 2444430.5	0	0	0	0	0	0	0	0	0	1283	1380	1478	1576	1675	1775	1875	1976	2077	2178	2280	2382
1980 JUL 10.0	0	0	0	0	0	0	0	0	0	-746	-796	-848	-902	-958	-1015	-1074	-1134	-1195	-1256	-1319	-1382
JD 2444420.5	0	0	0	0	0	0	0	0	1234	1331	1428	1526	1624	1723	1824	1923	2024	2125	2226	2328	2430
1980 JUN 30.0	0	0	0	0	0	0	0	0	-730	-779	-830	-883	-938	-995	-1054	-1113	-1173	-1235	-1297	-1360	-1423
JD 2444410.5	0	0	0	0	0	0	0	1185	1281	1378	1476	1573	1672	1770	1871	1971	2071	2172	2274	2375	2477
1980 JUN 20.0	0	0	0	0	0	0	0	-715	-762	-813	-865	-920	-976	-1033	-1092	-1152	-1213	-1275	-1338	-1401	-1465
JD 2444400.5	0	0	0	0	0	0	1136	1232	1328	1425	1522	1620	1718	1820	1918	2018	2118	2219	2321	2422	2524
1980 JUN 10.0	0	0	0	0	0	0	-700	-747	-796	-848	-901	-957	-1013	-1073	-1132	-1192	-1254	-1316	-1379	-1443	-1506
JD 2444390.5	0	0	0	0	0	1086	1182	1278	1374	1471	1569	1666	1764	1865	1964	2064	2165	2266	2367	2469	2570
1980 MAY 31.0	0	0	0	0	0	-687	-733	-781	-831	-884	-938	-995	-1052	-1111	-1171	-1233	-1295	-1357	-1421	-1484	-1548
JD 2444380.5	0	0	0	0	1037	1132	1228	1324	1420	1517	1614	1712	1815	1910	2010	2110	2210	2311	2413	2514	2616
1980 MAY 21.0	0	0	0	0	-675	-719	-766	-816	-868	-921	-976	-1033	-1093	-1151	-1212	-1274	-1336	-1399	-1462	-1526	-1589
JD 2444370.5	0	0	0	987	1082	1177	1273	1369	1466	1562	1659	1756	1858	1956	2055	2155	2256	2357	2458	2560	2662
1980 MAY 11.0	0	0	0	-665	-707	-753	-802	-852	-905	-959	-1015	-1072	-1132	-1192	-1253	-1315	-1378	-1441	-1504	-1567	-1630
JD 2444360.5	0	0	936	1031	1127	1222	1318	1414	1510	1607	1704	1813	1902	2001	2100	2200	2301	2402	2503	2605	2706
1980 MAY 1.0	0	0	-656	-698	-742	-789	-838	-890	-943	-998	-1055	-1117	-1173	-1233	-1295	-1357	-1419	-1482	-1545	-1608	-1670
JD 2444350.5	0	885	981	1076	1171	1267	1363	1459	1555	1652	1748	1849	1947	2045	2145	2245	2345	2446	2548	2649	2751
1980 APR 21.0	0	-650	-690	-733	-778	-826	-877	-929	-983	-1039	-1096	-1155	-1214	-1275	-1337	-1399	-1461	-1524	-1586	-1648	-1709
JD 2444340.5	834	930	1025	1120	1216	1311	1407	1503	1599	1695	1784	1893	1991	2090	2189	2289	2390	2491	2592	2694	2795
1980 APR 11.0	-648	-685	-726	-770	-816	-865	-916	-969	-1024	-1080	-1135	-1197	-1257	-1317	-1379	-1441	-1503	-1565	-1627	-1688	-1747
JD 2444330.5	878	974	1069	1164	1260	1355	1451	1547	1643	1739	1841	1937	2035	2134	2233	2333	2434	2535	2636	2738	2839
1980 APR 1.0	-684	-722	-764	-809	-856	-906	-957	-1011	-1066	-1122	-1181	-1239	-1299	-1360	-1421	-1483	-1545	-1607	-1668	-1727	-1784
JD 2444320.5	922	1018	1113	1208	1304	1399	1495	1591	1686	1777	1883	1980	2079	2177	2277	2377	2478	2579	2680	2782	2883
1980 MAR 22.0	-723	-762	-804	-850	-898	-948	-1000	-1053	-1108	-1164	-1224	-1283	-1343	-1403	-1464	-1526	-1587	-1648	-1707	-1765	-1779
(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)

JD2444400.5	JD2444440.5	JD2444480.5	JD2444520.5	JD2444560.5
1980 JUN 10.0	1980 JUL 20.0	1980 AUG 29.0	1980 OCT 8.0	1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E11

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

	(FLT T)(40)(30)(20)(10)(0)(10)(20)(30)(40)(50)(60)(70)(80)(90)(100)(110)(120)(130)(140)(150)(160)
JD 2444440.5	0 0 0 0 0 0 0 0 0 0 32 39 51 79 183 511 107 61 43 34 29
1980 JUL 20.0	0 0 0 0 0 0 0 0 0 0 3104 2307 1795 1450 1207 1031 901 802 727 669 625
JD 2444430.5	0 0 0 0 0 0 0 0 0 50 58 73 103 181 888 298 129 84 64 53 46
1980 JUL 10.0	0 0 0 0 0 0 0 0 0 3158 2353 1831 1477 1228 1046 912 810 731 671 625 591
JD 2444420.5	0 0 0 0 0 0 0 0 65 74 89 118 179 406 1317 253 142 101 80 68 61
1980 JUN 30.0	0 0 0 0 0 0 0 0 3192 2387 1860 1501 1246 1060 922 816 736 673 625 589 562
JD 2444410.5	0 0 0 0 0 0 0 78 87 102 128 178 309 1330 556 233 150 113 93 81 74
1980 JUN 20.0	0 0 0 0 0 0 0 3202 2406 1881 1519 1261 1071 930 822 739 675 625 587 559 539
JD 2444400.5	0 0 0 0 0 0 90 98 112 135 177 267 581 2478 404 222 156 123 104 93 86
1980 JUN 10.0	0 0 0 0 0 0 3186 2409 1890 1530 1271 1080 936 827 742 676 625 585 555 534 521
JD 2444390.5	0 0 0 0 0 101 108 121 141 176 243 413 1531 848 338 215 161 131 114 104 98
1980 MAY 31.0	0 0 0 0 0 3141 2393 1887 1532 1275 1084 940 829 743 676 623 583 552 529 514 506
JD 2444380.5	0 0 0 0 111 117 128 146 175 227 339 705 4462 563 301 209 164 138 123 114 109
1980 MAY 21.0	0 0 0 0 3066 2356 1870 1526 1273 1084 941 829 744 675 621 579 547 524 507 498 495
JD 2444370.5	0 0 0 121 126 135 150 175 217 296 492 1582 1199 445 277 205 167 145 131 123 120
1980 MAY 11.0	0 0 0 2961 2298 1838 1508 1264 1079 937 827 740 672 618 576 543 518 500 489 485 487
JD 2444360.5	0 0 130 134 141 154 174 209 269 394 782 7791 736 379 260 202 170 150 138 132 130
1980 MAY 1.0	0 0 2825 2218 1790 1479 1245 1067 929 821 735 670 614 571 537 512 493 481 475 475 482
JD 2444350.5	0 140 141 147 157 174 202 249 337 547 1551 1646 554 337 247 200 172 155 145 140 140
1980 APR 21.0	0 2660 2115 1726 1437 1218 1049 916 811 728 660 608 565 531 505 485 472 465 464 468 480
JD 2444340.5	150 149 152 161 175 198 235 300 434 823 6751 926 456 308 237 198 174 159 152 149 151
1980 APR 11.0	2469 1991 1644 1382 1180 1022 898 797 717 651 597 557 523 497 477 464 455 452 455 464 481
JD 2444330.5	157 158 164 175 194 224 274 367 580 1401 2248 665 394 285 229 196 175 164 158 157 162
1980 APR 1.0	1848 1547 1315 1133 989 873 778 702 639 588 548 515 489 469 454 445 441 443 450 463 484
JD 2444320.5	164 167 176 191 215 255 323 459 835 4656 1137 530 351 268 222 194 177 168 164 166 173
1980 MAR 22.0	1434 1234 1076 947 841 755 683 624 576 534 505 479 459 444 435 430 430 435 446 464 490
	(FLT T)(80)(90)(100)(110)(120)(130)(140)(150)(160)(170)(180)(190)(200)(210)(220)(230)(240)(250)(260)(270)(280)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M17 E11

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)
JD 2444440.5	0	0	0	0	0	0	0	0	0	0	662	637	618	604	593	584	576	569	562	554	545
1980 JUL 20.0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-9999	-9999	-9999	-5178	-3547	-2791	-2361	
JD 2444430.5	0	0	0	0	0	0	0	0	0	697	670	649	633	620	610	600	592	584	575	566	556
1980 JUL 10.0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-9999	-9999	-9999	-5621	-3759	-2922	-2453	-2158	
JD 2444420.5	0	0	0	0	0	0	0	0	732	704	681	663	648	636	625	616	606	597	587	577	565
1980 JUN 30.0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-9999	-9999	-9999	-6088	-3979	-3057	-2547	-2229	-2015	
JD 2444410.5	0	0	0	0	0	0	0	767	738	713	693	677	663	651	640	630	620	610	599	586	572
1980 JUN 20.0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-9999	-9999	-9999	-6562	-4200	-3193	-2642	-2300	-2072	-1912	
JD 2444400.5	0	0	0	0	0	0	802	772	746	724	706	691	678	665	655	644	633	621	609	595	579
1980 JUN 10.0	0	0	0	0	0	-9999	-9999	-9999	-9999	-9999	-9999	-9999	-7017	-4416	-3327	-2737	-2372	-2128	-1958	-1835	
JD 2444390.5	0	0	0	0	0	836	806	779	756	737	720	705	691	680	668	657	644	632	617	602	583
1980 MAY 31.0	0	0	0	0	-9999	-9999	-9999	-9999	-9999	-9999	-9999	-7416	-4615	-3455	-2829	-2442	-2184	-2004	-1873	-1778	
JD 2444380.5	0	0	0	0	869	839	812	788	767	749	734	720	704	693	681	668	655	641	625	607	587
1980 MAY 21.0	0	0	0	-9999	-9999	-9999	-9999	-9999	-9999	-9999	-7720	-4786	-3570	-2914	-2509	-2239	-2049	-1911	-1810	-1735	
JD 2444370.5	0	0	0	901	871	844	820	798	779	762	747	734	719	706	693	679	665	649	631	611	588
1980 MAY 11.0	0	0	-9999	-9999	-9999	-9999	-9999	-9999	-9999	-7887	-4911	-3667	-2991	-2571	-2290	-2092	-1947	-1841	-1762	-1704	
JD 2444360.5	0	0	929	902	875	851	829	809	791	775	760	740	731	718	704	689	673	656	636	614	588
1980 MAY 1.0	0	0	-9999	-9999	-9999	-9999	-9999	-9999	-9999	-7888	-4986	-3745	-3054	-2626	-2337	-2132	-1982	-1871	-1787	-1726	-1683
JD 2444350.5	0	955	930	905	881	859	839	820	803	788	773	757	743	729	714	698	681	662	640	616	587
1980 APR 21.0	0	-9999	-9999	-9999	-9999	-9999	-9999	-9999	-7712	-4996	-3780	-3102	-2670	-2378	-2169	-2015	-1899	-1812	-1747	-1700	-1668
JD 2444340.5	978	956	933	910	888	868	849	832	815	800	789	769	754	739	723	706	687	666	643	615	583
1980 APR 11.0	-9999	-9999	-9999	-9999	-9999	-9999	-9999	-7371	-4937	-3788	-3123	-2703	-2410	-2200	-2043	-1925	-1835	-1767	-1716	-1681	-1661
JD 2444330.5	978	958	937	916	896	877	860	843	827	812	794	780	765	748	731	713	693	670	644	613	577
1980 APR 1.0	-9999	-9999	-9999	-9999	-9999	-9999	-6900	-4810	-3758	-3131	-2722	-2434	-2224	-2067	-1948	-1856	-1785	-1732	-1694	-1670	-1659
JD 2444320.5	980	962	943	923	905	887	870	854	838	825	805	790	774	757	739	719	697	672	643	610	569
1980 MAR 22.0	-9999	-9999	-9999	-9999	-9999	-6340	-4621	-3689	-3111	-2719	-2446	-2241	-2086	-1967	-1874	-1802	-1747	-1706	-1679	-1664	1664
(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCJ 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E11

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)
JD 2444440.5	0	0	0	0	0	0	0	0	0	0	82	100	118	136	153	170	187	203	219	235	251
1980 JUL 20.0	0	0	0	0	0	0	0	0	0	0	68	81	94	107	119	132	144	156	168	179	191
JD 2444430.5	0	0	0	0	0	0	0	0	0	76	93	111	128	145	161	178	194	210	225	241	257
1980 JUL 10.0	0	0	0	0	0	0	0	0	0	66	79	91	104	116	128	141	152	164	176	188	199
JD 2444420.5	0	0	0	0	0	0	0	0	71	87	104	120	137	153	169	185	200	216	231	247	262
1980 JUN 30.0	0	0	0	0	0	0	0	0	64	76	89	101	113	125	137	149	161	173	184	196	207
JD 2444410.5	0	0	0	0	0	0	0	67	82	98	113	129	145	160	176	191	206	221	237	252	268
1980 JUN 20.0	0	0	0	0	0	0	0	62	74	86	98	110	122	134	146	158	169	181	192	203	215
JD 2444400.5	0	0	0	0	0	0	63	77	92	107	122	137	152	168	182	197	212	227	242	257	273
1980 JUN 10.0	0	0	0	0	0	0	60	72	84	96	107	119	131	143	154	166	177	189	200	211	222
JD 2444390.5	0	0	0	0	0	59	73	86	101	115	130	145	159	174	188	203	217	232	247	262	278
1980 MAY 31.0	0	0	0	0	0	59	70	81	93	105	116	128	140	151	163	174	185	196	207	219	230
JD 2444380.5	0	0	0	0	56	68	82	95	109	123	137	151	166	180	194	208	223	237	252	268	283
1980 MAY 21.0	0	0	0	0	57	68	79	91	102	114	125	136	148	159	170	182	193	204	215	226	237
JD 2444370.5	0	0	0	53	65	77	90	103	117	130	144	158	172	186	200	214	228	242	257	273	289
1980 MAY 11.0	0	0	0	56	66	77	88	100	111	122	133	145	156	167	178	189	200	211	222	233	244
JD 2444360.5	0	0	50	61	73	85	98	111	124	137	151	165	178	191	205	219	233	247	262	278	294
1980 MAY 1.0	0	0	54	65	75	86	97	108	119	130	142	153	164	175	186	197	208	219	229	240	251
JD 2444350.5	0	48	58	70	81	93	105	118	131	144	156	170	183	196	210	224	238	252	267	283	300
1980 APR 21.0	0	53	63	73	84	95	106	117	128	138	149	161	171	182	193	204	215	226	237	247	258
JD 2444340.5	46	56	66	77	89	100	112	125	137	150	161	176	188	202	215	228	242	257	272	288	305
1980 APR 11.0	52	62	72	82	93	103	114	125	136	146	157	168	179	190	201	211	222	233	244	254	265
JD 2444330.5	53	63	74	85	96	107	119	131	143	153	168	181	194	206	220	233	247	262	277	293	311
1980 APR 1.0	60	70	80	90	101	111	122	133	143	154	165	176	186	197	208	219	229	240	250	261	271
JD 2444320.5	61	70	81	91	102	114	125	137	149	160	174	186	198	211	224	238	252	266	282	299	318
1980 MAR 22.0	69	79	89	99	109	119	130	141	151	161	172	183	194	204	215	226	236	247	257	268	278

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M17 E11

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(-40)	(-30)	(-20)	(-10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)
JD 2444440.5 1980 JUL 20.0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444430.5 1980 JUL 10.0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444420.5 1980 JUN 30.0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444410.5 1980 JUN 20.0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444400.5 1980 JUN 10.0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444390.5 1980 MAY 31.0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444380.5 1980 MAY 21.0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444370.5 1980 MAY 11.0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444360.5 1980 MAY 1.0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444350.5 1980 APR 21.0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444340.5 1980 APR 11.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444330.5 1980 APR 1.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444320.5 1980 MAR 22.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)

JD2444400.5 1980 JUN 10.0 JD2444440.5 1980 JUL 20.0 JD2444480.5 1980 AUG 29.0 JD2444520.5 1980 OCT 8.0 JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

M17
E11

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)
JD 2444440.5	0	0	0	0	0	0	0	0	0	0	3708	3031	2512	2104	1777	1521	1290	1108	958	835	734
1980 JUL 20.0	0	0	0	0	0	0	0	0	0	0	5004	4197	3564	3050	2627	2268	1959	1695	1464	1262	1084
JD 2444430.5	0	0	0	0	0	0	0	0	0	3546	2907	2417	2031	1720	1504	1259	1081	936	817	719	640
1980 JUL 10.0	0	0	0	0	0	0	0	0	0	4908	4134	3523	3027	2615	2295	1963	1703	1475	1275	1099	944
JD 2444420.5	0	0	0	0	0	0	0	0	3366	2767	2309	1946	1654	1420	1306	1050	910	795	700	624	564
1980 JUN 30.0	0	0	0	0	0	0	0	0	4798	4058	3473	2995	2598	2264	2004	1709	1485	1287	1113	958	823
JD 2444410.5	0	0	0	0	0	0	0	3171	2613	2187	1850	1577	1354	1260	1025	879	768	677	604	546	502
1980 JUN 20.0	0	0	0	0	0	0	0	4674	3971	3413	2956	2573	2248	2028	1716	1492	1298	1126	972	837	720
JD 2444400.5	0	0	0	0	0	0	2959	2444	2052	1741	1489	1282	1124	1303	846	737	650	580	524	482	453
1980 JUN 10.0	0	0	0	0	0	0	4535	3870	3342	2907	2541	2228	1967	1886	1499	1307	1137	986	851	733	632
JD 2444390.5	0	0	0	0	0	2733	2262	1904	1621	1391	1202	1049	1044	837	703	618	552	498	458	430	415
1980 MAY 31.0	0	0	0	0	0	4381	3757	3260	2848	2500	2201	1945	1799	1515	1314	1147	998	864	746	643	559
JD 2444380.5	0	0	0	0	2493	2066	1743	1490	1283	1112	971	873	1765	672	584	520	469	431	404	389	386
1980 MAY 21.0	0	0	0	0	4213	3631	3165	2780	2451	2167	1921	1717	2078	1322	1155	1008	876	759	655	568	500
JD 2444370.5	0	0	0	2243	1860	1572	1348	1165	1013	888	788	843	700	548	484	437	401	375	360	357	365
1980 MAY 11.0	0	0	0	4032	3493	3060	2701	2393	2126	1892	1688	1594	1359	1162	1017	887	771	667	578	505	453
JD 2444360.5	0	0	1985	1644	1392	1197	1038	906	797	707	656	2934	525	447	401	368	344	330	326	333	353
1980 MAY 1.0	0	0	3837	3342	2943	2611	2326	2076	1856	1660	1502	2771	1174	1023	896	782	679	589	513	454	420
JD 2444350.5	0	1722	1422	1204	1037	903	792	699	621	564	653	629	413	363	331	310	297	293	299	317	349
1980 APR 21.0	0	3630	3179	2816	2511	2249	2017	1812	1628	1467	1408	1256	1031	903	791	690	599	521	459	415	398
JD 2444340.5	1460	1197	1012	872	761	670	594	530	480	467	2442	405	325	292	272	261	258	264	279	307	352
1980 APR 11.0	3412	3004	2677	2401	2162	1949	1761	1589	1436	1314	2472	1052	909	798	699	609	531	465	415	387	388
JD 2444330.5	975	818	704	615	545	485	435	394	370	479	656	294	252	233	223	221	227	241	266	305	362
1980 APR 1.0	2820	2528	2281	2066	1875	1701	1544	1400	1275	1240	1225	919	804	706	618	540	472	418	382	370	390
JD 2444320.5	629	536	468	416	372	335	305	285	300	1503	312	215	192	183	182	188	202	225	259	309	380
1980 MAR 22.0	2370	2151	1961	1790	1634	1491	1359	1239	1148	1824	955	810	712	626	548	480	423	381	359	364	402

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E11

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)
JD 2444440.5	0	0	0	0	0	0	0	0	0	0	8712	7228	6076	5154	4404	3790	3249	2803	2422	2096	1818
1980 JUL 20.0	0	0	0	0	0	0	0	0	0	0	1331	1429	1528	1627	1726	1826	1927	2028	2129	2231	2333
JD 2444430.5	0	0	0	0	0	0	0	0	0	8454	7040	5940	5057	4336	3798	3223	2784	2412	2092	1818	1584
1980 JUL 10.0	0	0	0	0	0	0	0	0	0	1283	1380	1478	1576	1675	1775	1875	1976	2077	2178	2280	2382
JD 2444420.5	0	0	0	0	0	0	0	0	8164	6826	5782	4941	4251	3684	3310	2759	2394	2082	1813	1582	1387
1980 JUN 30.0	0	0	0	0	0	0	0	0	1234	1331	1428	1526	1624	1723	1824	1923	2024	2125	2226	2328	2430
JD 2444410.5	0	0	0	0	0	0	0	7844	6584	5600	4805	4149	3603	3288	2741	2371	2066	1803	1576	1382	1222
1980 JUN 20.0	0	0	0	0	0	0	0	1185	1281	1378	1476	1573	1672	1770	1871	1971	2071	2172	2274	2375	2477
JD 2444400.5	0	0	0	0	0	0	7493	6315	5394	4648	4030	3510	3091	3188	2345	2044	1787	1565	1375	1214	1085
1980 JUN 10.0	0	0	0	0	0	0	1136	1232	1328	1425	1522	1620	1718	1820	1918	2018	2118	2219	2321	2422	2524
JD 2444390.5	0	0	0	0	0	7114	6019	5164	4469	3892	3403	2994	2843	2352	2016	1765	1549	1363	1204	1073	974
1980 MAY 31.0	0	0	0	0	0	1086	1182	1278	1374	1471	1569	1666	1764	1865	1964	2064	2165	2266	2367	2469	2570
JD 2444380.5	0	0	0	0	6707	5698	4908	4270	3734	3279	2893	2590	3844	1994	1738	1528	1346	1190	1059	956	886
1980 MAY 21.0	0	0	0	0	1037	1132	1228	1324	1420	1517	1614	1712	1815	1910	2010	2110	2210	2311	2413	2514	2616
JD 2444370.5	0	0	0	6275	5353	4632	4049	3558	3139	2779	2476	2436	2059	1710	1501	1324	1172	1043	938	862	819
1980 MAY 11.0	0	0	0	987	1062	1177	1273	1369	1466	1562	1659	1756	1858	1956	2055	2155	2256	2357	2458	2560	2662
JD 2444360.5	0	0	5822	4986	4335	3808	3364	2982	2652	2367	2158	5704	1699	1470	1297	1149	1023	918	838	787	773
1980 MAY 1.0	0	0	936	1031	1127	1222	1318	1414	1510	1607	1704	1813	1902	2001	2100	2200	2301	2402	2503	2605	2706
JD 2444350.5	0	5352	4601	4020	3549	3152	2809	2511	2249	2032	2062	1884	1443	1266	1122	999	896	814	757	732	747
1980 APR 21.0	0	885	981	1076	1171	1267	1363	1459	1555	1652	1748	1849	1947	2045	2145	2245	2345	2446	2548	2649	2751
JD 2444340.5	4872	4201	3688	3273	2923	2619	2355	2119	1915	1781	4914	1456	1234	1091	971	871	789	728	694	695	740
1980 APR 11.0	834	930	1025	1120	1216	1311	1407	1503	1599	1695	1784	1893	1991	2090	2189	2289	2390	2491	2592	2694	2795
JD 2444330.5	3796	3346	2985	2681	2420	2186	1978	1794	1645	1719	1881	1213	1056	939	842	761	699	659	648	675	752
1980 APR 1.0	878	974	1069	1164	1260	1355	1451	1547	1643	[illegible]	1841	1937	2035	2134	2233	2333	2434	2535	2636	2738	2839
JD 2444320.5	2999	2687	2429	2206	2006	1826	1664	1524	1449	3327	1267	1025	904	809	731	668	625	606	618	673	782
1980 MAR 22.0	922	1018	1113	1208	1304	1399	1495	1591	1686	1777	1883	1980	2079	2177	2277	2377	2478	2579	2680	2782	2883

(FLT T)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

M17
E12

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444560.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671720	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.612	DEGREES
MEAN ANOM. AT EPOCH	=	313.600	DEGREES
DATE OF NODAL PASSAGE	=	2444505.369	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444560.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338780	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.410	DEGREES
ARG. OF PERIHELION	=	286.297	DEGREES
MEAN ANOM. AT EPOCH	=	319.363	DEGREES
DATE OF NODAL PASSAGE	=	2444072.515	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.065	DEGREES

M17
E12

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)
JD 2444440.5	660	629	605	588	578	576	585	607	646	712	818	980	1205	1407	1335	1263	1191	1121	1052	984	918
1980 JUL 20.0	447	391	343	303	273	255	255	275	318	389	491	635	818	997	953	910	867	824	783	744	705
JD 2444430.5	624	600	583	572	569	575	592	624	678	765	899	1094	1338	1376	1304	1232	1161	1091	1022	955	890
1980 JUL 10.0	396	348	306	273	252	245	257	291	349	436	558	722	913	969	925	882	840	798	758	719	682
JD 2444420.5	594	577	565	561	565	578	605	649	720	830	995	1219	0	1346	1273	1202	1131	1061	993	927	862
1980 JUN 30.0	353	310	275	250	237	242	267	314	387	491	634	813	0	941	898	855	814	773	734	696	659
JD 2444410.5	569	558	553	554	565	587	624	682	773	909	1105	1345	1388	1316	1243	1172	1101	1032	965	899	835
1980 JUN 20.0	314	278	249	232	230	247	285	345	434	555	716	901	957	914	872	830	789	749	710	673	638
JD 2444400.5	550	544	544	552	570	601	649	724	837	1002	1224	1431	1358	1286	1214	1143	1073	1004	937	872	809
1980 JUN 10.0	281	251	230	221	230	259	309	383	487	627	801	974	931	888	846	805	764	725	688	651	617
JD 2444390.5	534	533	540	554	580	620	682	776	913	1107	1345	1402	1329	1257	1185	1114	1045	977	911	846	784
1980 MAY 31.0	253	229	216	217	237	277	340	428	548	704	885	948	906	863	822	781	741	703	666	631	597
JD 2444380.5	522	527	539	560	595	646	723	838	1003	1221	1445	1373	1300	1228	1157	1086	1017	950	885	821	759
1980 MAY 21.0	230	212	207	219	250	302	376	478	615	785	966	923	881	839	798	758	719	681	645	611	578
JD 2444370.5	514	524	542	571	614	679	773	911	1103	1338	1416	1344	1272	1200	1129	1059	991	924	859	796	735
1980 MAY 11.0	211	201	205	228	269	332	419	536	689	866	942	899	857	816	775	736	697	660	625	591	560
JD 2444360.5	509	524	549	586	640	719	833	997	1212	1460	1388	1316	1244	1172	1102	1032	965	898	834	772	712
1980 MAY 1.0	197	195	209	241	293	367	467	600	766	961	919	876	834	793	753	714	677	640	606	573	542
JD 2444350.5	507	528	560	606	671	767	904	1093	1326	1432	1360	1288	1216	1145	1075	1006	939	874	810	749	690
1980 APR 21.0	187	194	218	260	322	407	522	671	845	938	896	854	812	772	732	694	657	621	587	556	525
JD 2444340.5	508	535	575	630	710	824	985	1198	0	1404	1332	1261	1189	1118	1049	980	914	849	787	726	668
1980 APR 11.0	183	199	232	283	356	453	583	745	0	916	874	832	791	751	712	674	637	603	570	539	510
JD 2444330.5	512	546	594	661	756	891	1077	1309	1448	1377	1305	1233	1162	1092	1023	955	889	826	764	704	647
1980 APR 1.0	184	208	250	311	394	506	650	822	937	895	853	811	770	730	692	655	619	585	553	523	494
JD 2444320.5	520	561	618	698	811	969	1179	1419	1421	1349	1278	1206	1136	1066	997	930	865	802	741	683	626
1980 MAR 22.0	189	222	273	343	438	564	723	899	916	874	832	791	750	711	673	636	602	568	537	507	480

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)

JD2444600.5
1980 DEC 27.0

JD2444640.5
1981 FEB 5.0

JD2444680.5
1981 MAR 17.0

JD2444720.5
1981 APR 26.0

JD2444760.5
1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E12

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

	(FLT T)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)
JD 2444440.5		239	236	228	215	198	177	153	127	100	73	49	31	22	233	233	229	222	211	198	183	165
1980 JUL 20.0		902	992	1082	1170	1256	1340	1420	1498	1571	1638	1696	1738	1759	880	951	1021	1091	1161	1230	1297	1363
JD 2444430.5		241	239	231	218	201	181	157	132	106	81	60	46	41	232	232	229	223	213	201	186	168
1980 JUL 10.0		898	988	1078	1166	1253	1336	1416	1493	1563	1626	1677	1709	1720	861	932	1003	1074	1143	1212	1280	1347
JD 2444420.5		244	241	234	221	205	184	161	137	112	90	72	63	0	231	232	229	224	215	203	188	171
1980 JUN 30.0		894	985	1075	1163	1249	1332	1412	1486	1554	1611	1653	1674	0	843	914	985	1056	1126	1196	1264	1331
JD 2444410.5		247	244	237	224	208	188	166	142	119	100	87	81	225	229	231	229	224	216	205	191	174
1980 JUN 20.0		890	981	1071	1160	1246	1328	1406	1478	1542	1592	1624	1635	754	825	896	968	1039	1110	1179	1247	1314
JD 2444400.5		249	247	239	227	211	192	170	148	128	111	102	213	222	228	230	229	225	217	206	193	176
1980 JUN 10.0		887	978	1068	1157	1242	1323	1400	1468	1526	1568	1589	666	737	808	879	951	1022	1093	1163	1231	1298
JD 2444390.5		252	249	242	230	215	196	175	155	137	124	118	210	220	226	229	229	225	218	208	194	178
1980 MAY 31.0		884	975	1065	1153	1238	1318	1391	1456	1507	1539	1552	649	720	791	863	934	1006	1077	1147	1215	1282
JD 2444380.5		254	252	245	233	218	200	181	162	147	138	194	207	217	224	228	228	225	218	209	196	180
1980 MAY 21.0		881	972	1062	1149	1232	1310	1380	1439	1482	1505	564	633	703	775	846	918	990	1061	1131	1199	1266
JD 2444370.5		256	254	247	236	222	205	187	170	159	152	190	203	214	222	226	227	225	219	209	197	181
1980 MAY 11.0		878	969	1058	1144	1226	1301	1367	1419	1453	1467	548	617	688	759	831	902	974	1045	1115	1184	1251
JD 2444360.5		259	257	250	239	225	209	193	179	170	169	186	200	211	220	225	226	224	219	210	197	182
1980 MAY 1.0		875	966	1054	1139	1218	1290	1351	1395	1419	464	532	602	672	743	815	887	959	1030	1100	1168	1235
JD 2444350.5		260	259	252	242	229	214	200	189	183	164	182	196	208	217	223	225	223	218	210	198	182
1980 APR 21.0		872	962	1049	1132	1209	1276	1330	1366	1381	449	517	587	657	728	800	872	943	1015	1084	1153	1219
JD 2444340.5		262	261	255	245	233	219	207	199	0	159	177	193	205	215	221	224	223	218	210	198	182
1980 APR 11.0		869	957	1043	1124	1197	1260	1306	1332	0	435	503	572	642	713	785	857	928	1000	1069	1138	1203
JD 2444330.5		264	262	257	248	236	225	215	209	134	155	173	189	202	212	219	222	221	217	209	197	181
1980 APR 1.0		865	952	1036	1114	1183	1239	1276	1294	354	420	488	557	628	699	770	842	914	985	1054	1122	1188
JD 2444320.5		265	264	259	250	240	231	223	218	129	150	169	186	199	210	217	220	220	216	208	196	180
1980 MAR 22.0		861	946	1028	1102	1166	1214	1242	1253	340	407	474	543	613	684	756	828	899	970	1039	1107	1172
	(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

M17
E12

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)
JD 2444440.5	109	90	66	34	-6	-55	-107	-152	-185	-206	-218	-225	-230	-238	-238	-237	-235	-233	-230	-227	-223
1980 JUL 20.0	1605	1660	1726	1807	1908	2031	2171	2314	2442	2542	2607	2631	2607	2634	2666	2697	2727	2756	2784	2810	2836
JD 2444430.5	116	95	67	30	-15	-69	-121	-162	-190	-207	-217	-223	-224	-236	-237	-237	-236	-234	-232	-229	-225
1980 JUL 10.0	1590	1652	1728	1823	1939	2073	2216	2350	2460	2538	2578	2576	2528	2597	2629	2659	2689	2717	2745	2771	2796
JD 2444420.5	122	98	66	23	-29	-84	-133	-168	-192	-206	-214	-216	0	-234	-235	-235	-235	-234	-232	-230	-227
1980 JUN 30.0	1580	1651	1739	1848	1977	2118	2256	2374	2464	2519	2535	2508	0	2561	2592	2622	2651	2679	2706	2732	2756
JD 2444410.5	126	98	61	11	-44	-99	-142	-172	-191	-203	-208	-206	-227	-230	-232	-233	-233	-232	-231	-229	-227
1980 JUN 20.0	1574	1657	1758	1881	2019	2159	2286	2386	2454	2487	2480	2432	2494	2525	2555	2584	2613	2640	2667	2692	2717
JD 2444400.5	128	96	52	-2	-60	-111	-149	-174	-189	-197	-198	-218	-222	-225	-228	-229	-230	-230	-229	-228	-226
1980 JUN 10.0	1575	1670	1786	1920	2061	2194	2304	2385	2432	2444	2415	2427	2458	2489	2518	2547	2575	2602	2628	2654	2677
JD 2444390.5	127	89	39	-18	-75	-120	-152	-173	-184	-188	-184	-212	-216	-220	-223	-225	-226	-227	-227	-226	-224
1980 MAY 31.0	1584	1692	1821	1962	2099	2219	2311	2372	2399	2390	2342	2393	2423	2453	2482	2510	2538	2564	2590	2615	2638
JD 2444380.5	123	79	23	-35	-87	-126	-153	-169	-176	-175	-199	-205	-210	-214	-217	-220	-222	-223	-223	-223	-221
1980 MAY 21.0	1600	1722	1860	2002	2130	2232	2306	2348	2356	2327	2329	2359	2389	2418	2446	2474	2501	2527	2552	2576	2599
JD 2444370.5	116	66	7	-50	-96	-129	-150	-162	-165	-159	-191	-197	-203	-207	-211	-214	-216	-218	-219	-218	-217
1980 MAY 11.0	1624	1758	1901	2036	2150	2235	2291	2315	2304	2258	2296	2325	2354	2383	2410	2438	2464	2489	2514	2538	2561
JD 2444360.5	105	50	-9	-62	-102	-129	-145	-152	-150	-174	-182	-189	-195	-200	-204	-208	-210	-212	-213	-213	-212
1980 MAY 1.0	1656	1798	1939	2063	2160	2228	2267	2273	2244	2234	2263	2292	2320	2348	2375	2402	2427	2452	2477	2500	2522
JD 2444350.5	91	33	-24	-70	-104	-126	-137	-139	-131	-165	-173	-180	-186	-192	-196	-200	-203	-205	-206	-206	-205
1980 APR 21.0	1693	1838	1971	2080	2161	2212	2234	2223	2178	2202	2231	2259	2286	2313	2340	2366	2391	2416	2439	2462	2484
JD 2444340.5	75	16	-35	-75	-103	-119	-126	-122	0	-155	-163	-170	-177	-183	-188	-192	-195	-198	-199	-199	-198
1980 APR 11.0	1733	1875	1995	2088	2152	2187	2193	2165	0	2171	2198	2226	2253	2279	2305	2330	2355	2379	2403	2425	2447
JD 2444330.5	58	2	-43	-77	-99	-110	-111	-102	-135	-144	-152	-160	-167	-173	-179	-183	-187	-189	-191	-191	-189
1980 APR 1.0	1773	1904	2010	2086	2135	2155	2145	2103	2112	2139	2166	2193	2219	2245	2270	2295	2319	2343	2366	2388	2410
JD 2444320.5	42	-9	-48	-75	-92	-98	-93	-78	-124	-133	-142	-150	-157	-163	-169	-173	-177	-180	-181	-181	-180
1980 MAR 22.0	1807	1926	2015	2077	2110	2116	2090	2036	2081	2108	2134	2160	2186	2211	2236	2260	2284	2307	2330	2352	2373

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE — EARTH - MARS TRAJECTORY PARAMETERS — M17 E12

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)
JD 2444440.5 1980 JUL 20.0	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639
JD 2444430.5 1980 JUL 10.0	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571
JD 2444420.5 1980 JUN 30.0	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	0	1500	1500	1500	1500	1500	1500	1500	1500
JD 2444410.5 1980 JUN 20.0	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425
JD 2444400.5 1980 JUN 10.0	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347
JD 2444390.5 1980 MAY 31.0	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267
JD 2444380.5 1980 MAY 21.0	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185
JD 2444370.5 1980 MAY 11.0	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102
JD 2444360.5 1980 MAY 1.0	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020
JD 2444350.5 1980 APR 21.0	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941
JD 2444340.5 1980 APR 11.0	866	866	866	866	866	866	866	866	0	866	866	866	866	866	866	866	866	866	866	866	866
JD 2444330.5 1980 APR 1.0	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798
JD 2444320.5 1980 MAR 22.0	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
	JD2444600.5 1980 DEC 27.0			JD2444640.5 1981 FEB 5.0			JD2444680.5 1981 MAR 17.0			JD2444720.5 1981 APR 26.0			JD2444760.5 1981 JUN 5.0								

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

M17
E12

(FLT T)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)
JD 2444440.5	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368
1980 JUL 20.0	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678
JD 2444430.5	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376
1980 JUL 10.0	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717
JD 2444420.5	383	383	383	383	383	383	383	383	383	383	383	383	0	383	383	383	383	383	383	383	383
1980 JUN 30.0	758	758	758	758	758	758	758	758	758	758	758	758	0	758	758	758	758	758	758	758	758
JD 2444410.5	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387
1980 JUN 20.0	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802
JD 2444400.5	388	388	388	388	388	388	388	388	388	388	388	388	388	388	388	388	388	388	388	388	388
1980 JUN 10.0	849	849	849	849	849	849	849	849	849	849	849	849	849	849	849	849	849	849	849	849	849
JD 2444390.5	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387
1980 MAY 31.0	899	899	899	899	899	899	899	899	899	899	899	899	899	899	899	899	899	899	899	899	899
JD 2444380.5	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382
1980 MAY 21.0	955	955	955	955	955	955	955	955	955	955	955	955	955	955	955	955	955	955	955	955	955
JD 2444370.5	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372
1980 MAY 11.0	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016
JD 2444360.5	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355
1980 MAY 1.0	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084
JD 2444350.5	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332
1980 APR 21.0	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160
JD 2444340.5	299	299	299	299	299	299	299	299	0	299	299	299	299	299	299	299	299	299	299	299	299
1980 APR 11.0	1247	1247	1247	1247	1247	1247	1247	1247	0	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247
JD 2444330.5	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254
1980 APR 1.0	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345
JD 2444320.5	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
1980 MAR 22.0	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E12

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)
JD 2444440.5	2333	2435	2537	2638	2740	2841	2942	3042	3142	3241	3340	3438	3536	33	129	226	321	417	512	608	703
1980 JUL 20.0	-1341	-1404	-1467	-1531	-1594	-1658	-1719	-1779	1765	1720	1692	1696	1745	1788	1753	1717	1682	1646	1611	1576	1541
JD 2444430.5	2382	2484	2585	2687	2789	2890	2991	3091	3191	3290	3389	3487	3584	82	178	274	370	466	561	657	752
1980 JUL 10.0	-1382	-1445	-1509	-1573	-1636	-1698	-1759	1784	1734	1698	1687	1714	1785	1771	1735	1700	1664	1629	1594	1559	1525
JD 2444420.5	2430	2532	2634	2735	2837	2938	3039	3139	3239	3338	3437	3535	0	130	226	322	418	514	609	705	800
1980 JUN 30.0	-1423	-1487	-1551	-1614	-1677	-1738	-1796	1751	1709	1685	1693	1744	0	1753	1718	1682	1647	1612	1577	1543	1509
JD 2444410.5	2477	2579	2681	2783	2884	2985	3086	3187	3286	3386	3484	3581	80	177	274	370	466	561	657	752	848
1980 JUN 20.0	-1465	-1529	-1592	-1655	-1717	-1776	1768	1722	1689	1681	1711	1783	1771	1736	1701	1665	1630	1595	1561	1527	1494
JD 2444400.5	2524	2626	2728	2830	2931	3032	3133	3233	3333	3432	3531	30	127	224	321	417	513	608	704	799	894
1980 JUN 10.0	-1506	-1570	-1633	-1695	-1755	1787	1737	1698	1678	1688	1741	1789	1754	1719	1684	1648	1613	1579	1545	1511	1479
JD 2444390.5	2570	2672	2774	2876	2977	3079	3179	3280	3379	3478	3576	76	173	270	367	463	559	655	750	845	941
1980 MAY 31.0	-1548	-1611	-1673	-1734	-1792	1754	1710	1680	1675	1707	1778	1773	1738	1702	1667	1632	1597	1563	1529	1496	1464
JD 2444380.5	2616	2718	2820	2922	3023	3124	3225	3325	3425	3524	26	122	219	316	413	509	605	700	796	891	986
1980 MAY 21.0	-1589	-1652	-1713	-1772	1773	1724	1687	1670	1682	1735	1791	1756	1721	1686	1650	1616	1581	1547	1513	1481	1449
JD 2444370.5	2662	2763	2865	2967	3069	3170	3270	3371	3470	3568	70	167	265	362	458	554	650	746	841	936	1032
1980 MAY 11.0	-1630	-1691	-1751	1792	1741	1698	1671	1667	1700	1770	1775	1740	1705	1669	1634	1599	1565	1531	1498	1466	1435
JD 2444360.5	2706	2808	2910	3012	3113	3215	3315	3415	3515	20	114	212	310	407	503	599	695	791	886	981	1077
1980 MAY 1.0	-1670	-1730	-1787	1758	1712	1677	1661	1674	1727	1793	1759	1724	1688	1653	1618	1583	1549	1516	1483	1451	1420
JD 2444350.5	2751	2853	2955	3057	3158	3259	3360	3460	3558	61	159	257	354	451	548	644	740	835	931	1026	1121
1980 APR 21.0	-1709	-1767	1777	1727	1687	1661	1659	1691	1761	1778	1743	1708	1672	1637	1602	1568	1534	1500	1468	1437	1406
JD 2444340.5	2795	2897	2999	3101	3202	3303	3404	3504	0	105	203	301	398	495	592	688	784	880	975	1070	1166
1980 APR 11.0	-1747	1796	1744	1699	1666	1651	1665	1717	0	1763	1727	1692	1656	1621	1586	1552	1518	1485	1453	1422	1392
JD 2444330.5	2839	2941	3043	3145	3246	3347	3448	3547	51	149	247	345	443	540	636	732	828	924	1019	1114	1210
1980 APR 1.0	-1784	1761	1714	1675	1650	1648	1680	1750	1782	1747	1711	1676	1640	1605	1570	1536	1503	1470	1438	1408	1378
JD 2444320.5	2883	2985	3087	3189	3290	3391	3491	3582	94	193	291	389	486	583	680	776	872	968	1063	1158	1254
1980 MAR 22.0	1779	1729	1686	1654	1640	1654	1705	1782	1706	1731	1695	1659	1624	1589	1554	1520	1487	1455	1423	1393	1364
(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E12

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)
JD 2444440.5	29	26	24	24	24	24	26	28	33	40	54	84	210	411	105	61	44	35	30	27	25
1980 JUL 20.0	625	592	569	555	549	552	564	587	626	685	768	876	975	999	991	974	949	919	884	845	805
JD 2444430.5	46	42	40	39	40	41	45	50	60	76	108	199	1412	275	128	85	65	54	47	43	40
1980 JUL 10.0	591	566	550	542	542	551	570	603	652	724	822	932	998	996	983	962	935	902	866	826	786
JD 2444420.5	61	56	54	54	56	59	65	75	92	123	192	477	0	241	141	101	81	69	62	57	55
1980 JUN 30.0	562	544	534	532	538	554	581	623	685	771	879	976	0	991	974	950	920	885	848	808	767
JD 2444410.5	74	70	69	69	72	78	88	104	132	187	341	2134	491	225	149	114	94	83	75	71	69
1980 JUN 20.0	539	528	523	527	539	562	597	650	725	823	932	998	997	984	964	937	904	868	830	789	748
JD 2444400.5	86	83	82	84	90	98	113	138	183	285	684	1570	374	216	155	124	106	94	87	84	82
1980 JUN 10.0	521	515	516	525	544	574	618	683	770	878	974	1000	992	975	952	922	888	851	812	771	731
JD 2444390.5	98	96	96	100	108	121	142	180	254	454	2298	722	320	210	160	132	115	105	99	96	96
1980 MAY 31.0	506	505	512	527	552	590	645	721	820	929	997	997	985	965	939	908	872	834	794	754	713
JD 2444380.5	109	108	110	116	128	146	177	234	359	816	2484	511	289	206	163	139	124	115	110	108	109
1980 MAY 21.0	495	499	511	532	564	611	677	765	873	970	1000	993	977	954	926	893	856	817	777	737	697
JD 2444370.5	120	120	124	134	149	175	219	306	532	2168	989	415	268	202	166	145	132	124	120	120	123
1980 MAY 11.0	487	496	513	541	581	637	714	814	922	994	998	987	968	942	912	877	840	800	760	720	681
JD 2444360.5	130	132	139	152	173	209	273	411	880	4109	657	360	253	200	169	150	139	132	130	131	136
1980 MAY 1.0	482	496	519	553	602	668	757	864	964	1000	994	979	957	930	897	861	823	784	744	704	665
JD 2444350.5	140	145	155	172	201	250	344	578	1942	1325	512	323	241	197	171	155	146	141	140	143	151
1980 APR 21.0	480	499	528	570	627	704	803	913	991	998	988	970	946	916	883	846	807	768	728	689	651
JD 2444340.5	151	158	172	195	233	301	444	893	0	820	429	297	232	196	173	160	152	149	150	156	166
1980 APR 11.0	481	505	541	590	657	745	853	955	0	995	981	961	934	903	868	830	791	752	712	674	637
JD 2444330.5	162	172	190	220	271	368	598	1709	1787	612	375	277	225	194	175	164	158	157	160	168	183
1980 APR 1.0	484	514	556	614	692	790	901	985	999	990	973	950	921	889	853	815	776	736	697	659	623
JD 2444320.5	173	187	210	249	318	460	872	6631	1008	498	337	261	218	193	177	168	164	165	171	182	201
1980 MAR 22.0	490	526	576	643	731	839	945	998	996	984	964	939	908	874	838	799	760	721	683	646	610

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E12

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)
JD 2444440.5	545	535	523	509	492	470	443	408	362	300	218	116	24	-0	-9	-28	-56	-93	-136	-185	-239
1980 JUL 20.0	-2361	-2090	-1906	-1779	-1689	-1627	-1588	-1569	1574	1602	1660	1750	1848	2121	2149	2173	2190	2204	2212	2217	2217
JD 2444430.5	556	544	530	513	492	467	434	392	337	263	168	64	2	-3	-17	-41	-74	-113	-160	-211	-267
1980 JUL 10.0	-2158	-1960	-1822	-1724	-1655	-1610	-1585	1582	1600	1646	1723	1823	1903	2156	2181	2202	2217	2228	2234	2236	2235
JD 2444420.5	565	551	534	514	490	460	422	372	306	219	116	23	0	-9	-28	-56	-92	-136	-185	-239	-296
1980 JUN 30.0	-2015	-1866	-1760	-1684	-1633	-1602	-1591	1602	1636	1700	1793	1891	0	2189	2212	2229	2242	2250	2255	2255	2252
JD 2444410.5	572	556	537	514	486	450	405	346	269	171	66	2	-3	-17	-41	-73	-113	-159	-211	-266	-325
1980 JUN 20.0	-1912	-1797	-1715	-1657	-1621	-1603	1606	1630	1681	1762	1865	1945	2195	2220	2240	2255	2266	2272	2274	2273	2268
JD 2444400.5	579	560	538	511	479	437	384	315	225	119	26	-0	-8	-27	-55	-91	-134	-183	-237	-294	-354
1980 JUN 10.0	-1835	-1746	-1683	-1641	-1617	1613	1628	1668	1736	1831	1931	2199	2227	2250	2268	2280	2288	2292	2293	2289	2283
JD 2444390.5	583	562	537	506	468	420	358	278	177	70	3	-2	-16	-39	-71	-111	-157	-208	-264	-323	-383
1980 MAY 31.0	-1778	-1709	-1661	-1632	-1621	1629	1658	1713	1798	1902	1985	2233	2258	2278	2293	2304	2310	2312	2310	2305	2297
JD 2444380.5	587	563	534	499	455	399	327	235	127	30	0	-7	-26	-53	-88	-131	-180	-233	-291	-351	-412
1980 MAY 21.0	-1735	-1683	-1649	-1631	1633	1653	1696	1767	1866	1968	2236	2265	2288	2305	2318	2326	2330	2330	2326	2320	2311
JD 2444370.5	588	561	528	488	438	373	290	188	78	6	-2	-14	-37	-68	-107	-153	-204	-259	-318	-379	-441
1980 MAY 11.0	-1704	-1665	-1643	1638	1650	1683	1742	1829	1936	2023	2269	2295	2316	2331	2341	2347	2349	2347	2342	2334	2324
JD 2444360.5	588	558	521	475	417	342	249	138	37	0	-6	-24	-50	-85	-127	-175	-228	-285	-345	-407	-469
1980 MAY 1.0	-1683	-1655	-1644	1650	1674	1721	1795	1896	2002	2272	2301	2324	2342	2355	2363	2367	2367	2363	2357	2348	2336
JD 2444350.5	587	552	510	458	391	306	202	89	10	-1	-13	-34	-65	-103	-148	-198	-253	-312	-372	-434	-496
1980 APR 21.0	-1668	-1652	1652	1668	1705	1766	1855	1965	2058	2305	2331	2352	2367	2378	2384	2386	2384	2379	2371	2360	2348
JD 2444340.5	583	544	496	437	361	265	153	46	0	-5	-21	-47	-81	-122	-169	-222	-279	-338	-399	-461	-523
1980 APR 11.0	-1661	1656	1665	1692	1742	1818	1921	2032	0	2336	2360	2378	2391	2399	2403	2403	2400	2393	2384	2373	2359
JD 2444330.5	577	534	480	412	326	220	103	15	-0	-11	-31	-60	-98	-142	-192	-246	-304	-365	-426	-488	-549
1980 APR 1.0	-1659	1664	1683	1723	1786	1877	1990	2090	2339	2356	2387	2402	2413	2420	2422	2420	2415	2407	2397	2384	2370
JD 2444320.5	569	520	459	382	285	171	58	2	-4	-19	-43	-76	-116	-163	-215	-271	-330	-391	-453	-515	-575
1980 MAR 22.0	1664	1677	1707	1759	1837	1942	2058	2135	2370	2394	2412	2426	2434	2439	2439	2436	2429	2420	2408	2395	2380

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)

JD2444600.5	JD2444640.5	JD2444680.5	JD2444720.5	JD2444760.5
1980 DEC 27.0	1981 FEB 5.0	1981 MAR 17.0	1981 APR 26.0	1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E12

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)
JD 2444440.5	251	268	284	301	318	337	359	383	416	463	546	748	1664	93	94	96	98	100	102	105	108
1980 JUL 20.0	191	202	214	225	236	247	258	269	279	289	299	308	314	161	165	169	173	178	183	188	194
JD 2444430.5	257	273	290	307	325	345	367	396	434	496	621	1003	6580	94	95	97	99	101	104	107	110
1980 JUL 10.0	199	210	222	233	244	255	265	276	286	296	305	313	319	165	168	173	177	182	187	192	198
JD 2444420.5	262	279	295	313	331	353	378	410	458	543	748	1668	0	95	96	98	100	103	105	109	112
1980 JUN 30.0	207	218	229	240	251	262	273	283	293	302	311	318	0	168	172	176	181	186	191	196	202
JD 2444410.5	268	284	301	319	338	361	389	428	490	616	993	5684	94	96	97	99	102	104	107	110	114
1980 JUN 20.0	215	226	237	248	259	269	280	290	299	308	316	322	168	171	176	180	185	190	195	200	206
JD 2444400.5	273	289	306	325	346	371	403	451	535	735	1593	94	95	97	98	101	103	106	109	112	116
1980 JUN 10.0	222	233	244	255	266	276	286	296	306	314	321	167	171	175	179	184	188	194	199	205	210
JD 2444390.5	278	295	312	332	354	382	420	481	603	958	4434	95	96	98	100	102	104	107	110	114	118
1980 MAY 31.0	230	240	251	262	273	283	293	303	312	319	325	171	174	178	183	187	192	197	203	209	215
JD 2444380.5	283	300	319	339	364	395	442	524	713	1468	95	96	97	99	101	103	106	109	112	116	120
1980 MAY 21.0	237	248	258	269	279	290	299	309	317	324	170	174	178	182	186	191	196	201	207	213	219
JD 2444370.5	289	306	325	347	374	411	470	586	908	3385	95	97	98	100	102	105	107	111	114	118	122
1980 MAY 11.0	244	255	265	276	286	296	306	315	322	328	174	177	181	186	190	195	200	205	211	217	223
JD 2444360.5	294	312	332	356	387	432	509	683	1323	95	96	98	99	101	104	106	109	112	116	119	124
1980 MAY 1.0	251	262	272	283	293	302	312	320	327	173	177	181	185	189	194	199	204	209	215	221	228
JD 2444350.5	300	318	340	366	402	458	565	849	2615	96	97	99	101	103	105	108	111	114	118	121	126
1980 APR 21.0	258	268	279	289	299	309	317	325	331	177	180	184	188	193	198	203	208	214	219	226	232
JD 2444340.5	305	325	348	378	420	492	649	1181	0	97	98	100	102	104	107	109	112	116	119	123	128
1980 APR 11.0	265	275	286	296	305	315	323	330	0	180	184	188	192	197	201	207	212	218	224	230	236
JD 2444330.5	311	332	357	391	444	541	789	2067	97	98	99	101	103	105	108	111	114	118	121	125	130
1980 APR 1.0	271	282	292	302	311	320	328	334	180	183	187	191	196	200	205	211	216	222	228	234	241
JD 2444320.5	318	340	368	408	475	614	1053	6089	98	99	101	102	104	107	110	113	116	120	123	128	132
1980 MAR 22.0	278	288	298	308	317	326	333	338	183	187	191	195	199	204	209	215	220	226	232	239	245

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M17 E12

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)
JD 2444440.5 1980 JUL 20.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444430.5 1980 JUL 10.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444420.5 1980 JUN 30.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	0	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444410.5 1980 JUN 20.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444400.5 1980 JUN 10.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444390.5 1980 MAY 31.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444380.5 1980 MAY 21.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444370.5 1980 MAY 11.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444360.5 1980 MAY 1.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444350.5 1980 APR 21.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444340.5 1980 APR 11.0	1524	1524	1524	1524	1524	1524	1524	1524	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444330.5 1980 APR 1.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444320.5 1980 MAR 22.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)
JD2444600.5 1980 DEC 27.0																					
JD2444640.5 1981 FEB 5.0																					
JD2444680.5 1981 MAR 17.0																					
JD2444720.5 1981 APR 26.0																					
JD2444760.5 1981 JUN 5.0																					

EARTH DEPARTURE OR ARRIVAL DATE

M17
E12

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)
JD 2444440.5	734	653	592	548	523	519	541	595	697	870	1152	1598	2232	2812	2604	2397	2194	1994	1799	1610	1428
1980 JUL 20.0	1084	930	798	690	610	565	563	615	730	922	1211	1623	2158	2684	2554	2426	2300	2176	2056	1939	1827
JD 2444430.5	640	579	535	508	501	515	558	641	781	1009	1373	1918	2611	2722	2515	2309	2107	1909	1716	1529	1349
1980 JUL 10.0	944	810	698	611	555	538	568	656	813	1054	1402	1876	2435	2600	2471	2345	2221	2099	1982	1868	1759
JD 2444420.5	564	520	492	481	490	524	591	705	891	1186	1640	2271	0	2635	2427	2223	2022	1826	1635	1451	1273
1980 JUN 30.0	823	708	616	550	519	531	594	720	919	1211	1620	2141	0	2518	2391	2267	2145	2026	1911	1800	1694
JD 2444410.5	502	474	460	465	491	545	639	791	1031	1403	1948	2632	2756	2548	2342	2138	1939	1745	1556	1374	1200
1980 JUN 20.0	720	623	550	506	501	543	640	804	1048	1394	1858	2401	2566	2439	2314	2191	2071	1955	1842	1734	1631
JD 2444400.5	453	438	440	460	504	581	705	901	1204	1661	2285	2880	2671	2464	2258	2056	1858	1666	1480	1301	1129
1980 JUN 10.0	632	553	500	480	502	574	705	907	1198	1600	2108	2615	2489	2363	2239	2118	2001	1886	1777	1671	1571
JD 2444390.5	415	413	428	465	528	631	791	1038	1414	1956	2631	2795	2587	2380	2176	1975	1780	1590	1406	1229	1061
1980 MAY 31.0	559	498	465	469	519	622	788	1031	1372	1825	2354	2540	2414	2290	2168	2048	1933	1821	1713	1611	1514
JD 2444380.5	386	397	427	480	565	697	899	1206	1661	2278	2920	2712	2505	2299	2096	1897	1703	1515	1334	1160	995
1980 MAY 21.0	500	457	446	475	552	686	888	1175	1567	2061	2592	2467	2342	2219	2098	1981	1867	1758	1653	1553	1459
JD 2444370.5	365	390	434	506	616	782	1032	1408	1944	2612	2838	2630	2423	2218	2017	1820	1628	1443	1265	1094	931
1980 MAY 11.0	453	429	441	495	600	766	1006	1339	1780	2298	2521	2396	2272	2150	2031	1916	1804	1697	1595	1498	1406
JD 2444360.5	353	391	451	543	681	886	1194	1644	2253	2964	2757	2549	2343	2140	1940	1745	1555	1373	1197	1029	870
1980 MAY 1.0	420	415	449	529	663	862	1142	1524	2006	2577	2452	2328	2205	2085	1967	1854	1744	1639	1540	1445	1356
JD 2444350.5	349	400	478	593	763	1015	1387	1914	2577	2883	2676	2469	2264	2062	1864	1671	1484	1304	1132	967	811
1980 APR 21.0	398	414	471	577	740	974	1298	1727	2236	2510	2385	2262	2140	2021	1905	1794	1686	1584	1486	1395	1308
JD 2444340.5	352	418	515	656	863	1169	1612	2213	0	2803	2597	2391	2187	1986	1790	1599	1415	1238	1068	907	754
1980 APR 11.0	388	425	506	637	831	1104	1474	1945	0	2445	2321	2198	2078	1960	1846	1736	1631	1531	1436	1346	1263
JD 2444330.5	362	445	563	735	986	1352	1871	2528	2929	2724	2518	2313	2110	1912	1718	1529	1348	1173	1007	848	699
1980 APR 1.0	390	448	552	711	936	1252	1669	2170	2507	2382	2258	2137	2017	1901	1789	1681	1578	1480	1387	1300	1219
JD 2444320.5	380	481	624	831	1133	1568	2159	2847	2850	2645	2440	2236	2035	1838	1647	1461	1282	1110	947	792	646
1980 MAR 22.0	402	481	610	798	1061	1470	1880	2394	2445	2321	2198	2077	1959	1845	1734	1628	1527	1431	1341	1256	1178

(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E12

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)
JD 2444440.5	1818	1583	1390	1238	1134	1084	1104	1210	1427	1792	2363	3221	4390	5496	5158	4823	4493	4170	3855	3550	3255
1980 JUL 20.0	2333	2435	2537	2638	2740	2841	2942	3042	3142	3241	3340	3438	3536	33	129	226	321	417	512	608	703
JD 2444430.5	1584	1389	1233	1120	1056	1053	1126	1297	1594	2063	2776	3795	5046	5322	4986	4654	4327	4008	3698	3397	3108
1980 JUL 10.0	2382	2484	2585	2687	2789	2890	2991	3091	3191	3290	3389	3487	3584	82	178	274	370	466	561	657	752
JD 2444420.5	1387	1228	1108	1031	1009	1054	1185	1425	1810	2398	3260	4412	0	5153	4819	4489	4166	3851	3546	3250	2967
1980 JUN 30.0	2430	2532	2634	2735	2837	2938	3039	3139	3239	3338	3437	3535	0	130	226	322	418	514	609	705	800
JD 2444410.5	1222	1096	1010	971	992	1088	1279	1594	2078	2797	3807	5033	5322	4988	4656	4329	4010	3699	3399	3109	2831
1980 JUN 20.0	2477	2579	2681	2783	2884	2985	3086	3187	3286	3386	3484	3581	80	177	274	370	466	561	657	752	848
JD 2444400.5	1085	991	939	939	1005	1155	1410	1808	2402	3261	4393	5495	5160	4827	4497	4174	3859	3553	3256	2972	2700
1980 JUN 10.0	2524	2626	2728	2830	2931	3032	3133	3233	3333	3432	3531	30	127	224	321	417	513	608	704	799	894
JD 2444390.5	974	911	894	934	1047	1253	1579	2069	2786	3781	4985	5335	5001	4670	4343	4024	3712	3410	3119	2840	2574
1980 MAY 31.0	2570	2672	2774	2876	2977	3079	3179	3280	3379	3478	3576	76	173	270	367	463	559	655	750	845	941
JD 2444380.5	886	854	872	955	1117	1383	1787	2381	3228	4340	5513	5179	4846	4517	4194	3877	3570	3273	2987	2714	2454
1980 MAY 21.0	2616	2718	2820	2922	3023	3124	3225	3325	3425	3524	26	122	219	316	413	509	605	700	796	891	986
JD 2444370.5	819	819	875	1001	1216	1548	2038	2747	3724	4910	5359	5026	4695	4369	4048	3736	3433	3140	2860	2592	2337
1980 MAY 11.0	2662	2763	2865	2967	3069	3170	3270	3371	3470	3568	70	167	265	362	458	554	650	746	841	936	1032
JD 2444360.5	773	807	901	1073	1344	1748	2336	3168	4259	5541	5209	4877	4548	4224	3907	3598	3300	3012	2737	2474	2226
1980 MAY 1.0	2706	2808	2910	3012	3113	3215	3315	3415	3515	20	114	212	310	407	503	599	695	791	886	981	1077
JD 2444350.5	747	815	949	1170	1502	1988	2685	3642	4813	5393	5061	4731	4404	4083	3770	3465	3171	2888	2618	2361	2119
1980 APR 21.0	2751	2853	2955	3057	3158	3259	3360	3460	3558	61	159	257	354	451	548	644	740	835	931	1026	1121
JD 2444340.5	740	843	1021	1293	1694	2272	3086	4157	0	5248	4917	4589	4264	3946	3636	3336	3046	2769	2504	2253	2016
1980 APR 11.0	2795	2897	2999	3101	3202	3303	3404	3504	0	105	203	301	398	495	592	688	784	880	975	1070	1166
JD 2444330.5	752	892	1115	1445	1923	2604	3540	4698	5436	5106	4776	4449	4128	3813	3507	3210	2926	2653	2394	2149	1918
1980 APR 1.0	2839	2941	3043	3145	3246	3347	3448	3547	51	149	247	345	443	540	636	732	828	924	1019	1114	1210
JD 2444320.5	782	962	1234	1628	2194	2987	4039	5241	5296	4966	4638	4313	3995	3683	3381	3089	2809	2542	2288	2048	1824
1980 MAR 22.0	2883	2985	3087	3189	3290	3391	3491	3582	94	193	291	389	486	583	680	776	872	968	1063	1158	1254
(FLT T)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

M17
E13

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444660.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671709	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.616	DEGREES
MEAN ANOM. AT EPOCH	=	52.160	DEGREES
DATE OF NODAL PASSAGE	=	2444870.621	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444660.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338806	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.412	DEGREES
ARG. OF PERIHELION	=	286.300	DEGREES
MEAN ANOM. AT EPOCH	=	11.765	DEGREES
DATE OF NODAL PASSAGE	=	2444759.492	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.066	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E13

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)
JD 2444440.5	918	854	792	733	675	619	566	515	466	419	375	345	294	256	222	193	170	157	156	169	196
1980 JUL 20.0	705	668	633	599	568	538	510	484	461	439	420	411	386	373	363	355	349	347	347	351	360
JD 2444430.5	890	827	765	706	649	595	542	492	444	399	358	362	276	239	208	181	163	157	164	184	218
1980 JUL 10.0	682	646	612	579	549	520	494	469	447	427	411	404	377	365	356	350	346	345	348	354	366
JD 2444420.5	862	800	739	681	625	571	519	470	423	380	386	306	259	224	195	173	160	160	175	203	243
1980 JUN 30.0	659	624	591	560	531	503	478	455	434	416	426	382	368	358	350	345	343	344	349	358	372
JD 2444410.5	835	774	714	656	601	548	498	449	404	369	494	284	244	211	185	167	160	168	190	225	271
1980 JUN 20.0	638	604	572	542	513	487	463	441	422	410	454	372	360	352	345	342	341	344	351	362	380
JD 2444400.5	809	748	689	633	578	526	477	430	388	421	327	266	229	199	176	164	165	180	208	249	303
1980 JUN 10.0	617	584	553	524	497	472	449	429	412	435	382	363	353	345	340	338	339	344	353	368	389
JD 2444390.5	784	724	666	610	557	505	457	412	382	766	296	251	216	189	171	164	172	194	229	277	337
1980 MAY 31.0	597	565	535	507	481	457	436	418	408	593	369	355	346	340	336	336	338	345	357	375	400
JD 2444380.5	759	700	643	588	535	485	438	398	440	362	276	236	205	181	168	168	183	212	253	307	374
1980 MAY 21.0	578	547	518	491	466	444	424	408	435	387	359	348	340	335	333	334	338	347	362	383	413
JD 2444370.5	735	677	621	567	515	466	422	395	1247	313	260	223	195	176	168	175	197	232	279	339	415
1980 MAY 11.0	560	530	502	476	452	431	413	405	883	366	350	341	334	330	329	332	339	350	367	392	427
JD 2444360.5	712	655	599	546	496	449	409	448	414	289	245	212	187	173	172	185	213	254	308	375	459
1980 MAY 1.0	542	513	486	461	439	419	404	429	401	355	342	334	329	326	327	331	340	354	374	404	445
JD 2444350.5	690	633	579	527	477	433	407	1306	335	271	232	202	181	172	178	198	232	279	339	414	508
1980 APR 21.0	525	497	471	448	426	408	401	938	366	346	335	328	324	323	325	331	342	359	383	417	465
JD 2444340.5	668	612	559	508	460	421	451	492	304	255	220	194	178	175	187	213	253	306	372	456	562
1980 APR 11.0	510	482	457	435	415	400	421	430	352	337	328	322	320	320	324	332	345	365	393	433	488
JD 2444330.5	647	592	539	490	445	419	949	363	283	241	210	187	176	180	198	231	277	335	409	502	622
1980 APR 1.0	494	468	444	422	404	397	706	369	342	330	322	317	316	318	323	334	349	373	405	451	516
JD 2444320.5	626	572	521	473	434	453	610	321	266	229	201	183	178	187	212	251	302	367	449	553	688
1980 MAR 22.0	480	454	431	411	396	412	487	351	333	323	316	313	313	316	323	336	355	382	420	473	548

(FLT T)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E13

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)
JD 2444440.5	165	145	123	99	74	48	22	-4	-31	-59	-95	-241	-36	-80	-93	-94	-84	-62	-32	-3	14
1980 JUL 20.0	1364	1429	1493	1555	1617	1677	1736	1793	1849	1901	1946	1945	2071	2088	2100	2094	2061	2001	1924	1852	1802
JD 2444430.5	168	148	126	103	78	52	25	-2	-32	-68	-139	210	-18	-51	-60	-56	-39	-12	16	38	50
1980 JUL 10.0	1347	1412	1476	1539	1600	1659	1717	1773	1825	1872	1900	2125	2040	2052	2053	2032	1985	1913	1836	1774	1738
JD 2444420.5	171	151	130	106	81	55	27	-2	-37	-91	-342	87	1	-22	-26	-15	7	35	60	75	79
1980 JUN 30.0	1331	1396	1460	1522	1583	1641	1698	1751	1799	1836	1795	2014	2006	2011	2000	1965	1904	1826	1754	1705	1682
JD 2444410.5	174	154	133	109	84	57	28	-5	-50	-152	400	74	22	7	10	27	53	80	98	105	104
1980 JUN 20.0	1314	1380	1443	1505	1565	1623	1677	1728	1770	1786	2230	1969	1969	1965	1942	1893	1820	1742	1680	1643	1632
JD 2444400.5	176	157	136	112	86	58	26	-13	-80	-368	206	80	46	39	48	70	97	119	129	130	125
1980 JUN 10.0	1298	1364	1427	1489	1548	1604	1656	1702	1734	1685	1972	1931	1929	1915	1878	1815	1736	1663	1612	1589	1587
JD 2444390.5	178	159	138	114	87	57	21	-30	-149	458	164	93	72	72	88	113	137	151	155	151	143
1980 MAY 31.0	1282	1348	1411	1471	1529	1584	1633	1673	1684	2435	1906	1892	1885	1860	1809	1735	1655	1590	1552	1540	1546
JD 2444380.5	180	161	139	115	87	54	11	-63	-351	319	155	111	100	107	128	152	170	178	176	169	158
1980 MAY 21.0	1266	1331	1394	1454	1511	1563	1608	1637	1598	1947	1861	1852	1836	1798	1735	1654	1577	1524	1498	1495	1507
JD 2444370.5	181	162	140	115	85	48	-6	-134	342	249	160	132	129	143	166	187	198	199	193	184	172
1980 MAY 11.0	1251	1315	1378	1437	1492	1541	1580	1591	2591	1850	1819	1808	1782	1732	1657	1574	1505	1464	1449	1454	1471
JD 2444360.5	182	163	140	114	81	37	-41	-313	422	226	171	155	160	179	200	215	220	216	208	197	184
1980 MAY 1.0	1235	1299	1361	1418	1471	1517	1547	1523	1950	1794	1777	1760	1723	1660	1577	1496	1438	1409	1404	1415	1436
JD 2444350.5	182	163	140	111	74	18	-109	-729	330	222	187	180	192	212	230	238	237	230	220	208	196
1980 APR 21.0	1219	1283	1344	1400	1450	1491	1506	2119	1799	1748	1734	1708	1659	1583	1497	1423	1377	1359	1362	1379	1402
JD 2444340.5	182	162	138	106	62	-15	-265	506	292	226	205	207	222	242	254	256	250	241	230	218	206
1980 APR 11.0	1204	1267	1326	1381	1428	1461	1453	1994	1728	1704	1687	1651	1588	1504	1419	1355	1321	1313	1323	1344	1368
JD 2444330.5	181	161	134	99	43	-79	-650	405	278	236	225	233	251	266	272	269	260	249	238	226	215
1980 APR 1.0	1188	1250	1308	1361	1403	1425	1597	1754	1677	1660	1636	1588	1513	1424	1344	1292	1269	1270	1286	1309	1334
JD 2444320.5	180	158	129	87	10	-214	555	352	275	248	247	259	276	286	285	278	268	256	245	234	224
1980 MAR 22.0	1172	1233	1290	1340	1377	1384	2093	1663	1631	1613	1580	1520	1435	1345	1274	1234	1222	1230	1250	1275	1299
(FLT T)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E13

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

	(FLT T)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)
JD 2444440.5		-223	-219	-214	-209	-204	-198	-192	-186	-179	-171	-159	-88	-199	-177	-169	-164	-160	-158	-157	-157	-158
1980 JUL 20.0		2836	2860	2883	2904	2925	2944	2961	2978	2993	3006	3016	3006	3050	3054	3059	3064	3067	3069	3070	3068	3065
JD 2444430.5		-225	-221	-217	-212	-207	-202	-196	-189	-181	-168	-136	-350	-209	-191	-182	-177	-173	-171	-169	-169	-170
1980 JUL 10.0		2796	2820	2842	2864	2884	2903	2920	2936	2950	2961	2966	3019	3006	3011	3016	3019	3022	3023	3022	3020	3015
JD 2444420.5		-227	-223	-219	-215	-210	-204	-197	-189	-178	-156	-25	-266	-217	-202	-193	-188	-184	-181	-180	-180	-181
1980 JUN 30.0		2756	2780	2802	2823	2843	2861	2878	2893	2906	2915	2888	2961	2962	2967	2971	2974	2976	2976	2974	2970	2964
JD 2444410.5		-227	-224	-220	-216	-211	-205	-197	-187	-169	-121	-528	-254	-224	-211	-202	-197	-193	-190	-189	-189	-189
1980 JUN 20.0		2717	2740	2762	2783	2802	2820	2837	2851	2863	2865	2887	2913	2917	2922	2926	2928	2929	2928	2925	2920	2912
JD 2444400.5		-226	-223	-220	-215	-210	-203	-194	-180	-150	6	-332	-252	-229	-218	-210	-204	-201	-198	-196	-196	-196
1980 JUN 10.0		2677	2700	2722	2742	2761	2779	2795	2809	2818	2788	2862	2867	2872	2877	2880	2882	2882	2880	2875	2868	2858
JD 2444390.5		-224	-222	-218	-214	-208	-200	-188	-167	-107	-673	-297	-252	-234	-223	-216	-210	-206	-204	-202	-201	-202
1980 MAY 31.0		2638	2661	2682	2702	2721	2738	2753	2766	2770	2524	2814	2821	2827	2832	2834	2835	2834	2831	2825	2816	2804
JD 2444380.5		-221	-219	-215	-211	-204	-194	-178	-143	18	-401	-283	-252	-237	-227	-220	-215	-211	-208	-206	-205	-205
1980 MAY 21.0		2599	2622	2643	2662	2681	2698	2712	2723	2701	2748	2768	2776	2782	2786	2788	2788	2786	2781	2774	2763	2748
JD 2444370.5		-217	-215	-211	-206	-198	-185	-162	-96	-595	-336	-275	-252	-239	-230	-223	-217	-213	-210	-208	-206	-206
1980 MAY 11.0		2561	2583	2603	2623	2641	2657	2671	2678	2004	2708	2722	2730	2736	2740	2741	2740	2737	2731	2722	2709	2692
JD 2444360.5		-212	-209	-205	-199	-189	-172	-134	22	-470	-309	-270	-251	-239	-231	-224	-219	-214	-211	-208	-206	-205
1980 MAY 1.0		2522	2544	2564	2583	2601	2618	2631	2620	2610	2665	2677	2685	2690	2693	2694	2692	2688	2680	2669	2654	2634
JD 2444350.5		-205	-203	-198	-191	-178	-153	-85	279	-371	-293	-265	-249	-238	-230	-223	-218	-213	-209	-206	-204	-201
1980 APR 21.0		2484	2506	2526	2545	2562	2579	2590	2279	2595	2621	2632	2640	2645	2647	2647	2644	2638	2629	2616	2598	2575
JD 2444340.5		-198	-195	-189	-180	-162	-124	22	-534	-330	-282	-259	-246	-236	-228	-221	-216	-211	-206	-202	-199	-195
1980 APR 11.0		2447	2468	2488	2507	2524	2541	2542	2429	2558	2577	2588	2595	2599	2600	2599	2595	2588	2577	2562	2542	2515
JD 2444330.5		-189	-186	-179	-166	-141	-75	292	-402	-305	-272	-254	-241	-232	-224	-218	-212	-206	-201	-197	-192	-187
1980 APR 1.0		2410	2430	2450	2469	2487	2503	2347	2472	2517	2533	2543	2550	2553	2554	2551	2546	2537	2525	2508	2484	2453
JD 2444320.5		-180	-175	-166	-149	-111	23	-577	-344	-288	-262	-247	-236	-227	-219	-213	-206	-200	-195	-189	-183	-175
1980 MAR 22.0		2373	2393	2413	2433	2452	2463	2183	2447	2475	2490	2499	2505	2507	2507	2504	2497	2487	2472	2453	2426	2390
	(FLT T)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE — EARTH - MARS TRAJECTORY PARAMETERS — M17 E13

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)
JD 2444440.5 1980 JUL 20.0	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639
JD 2444430.5 1980 JUL 10.0	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571
JD 2444420.5 1980 JUN 30.0	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
JD 2444410.5 1980 JUN 20.0	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425	1425
JD 2444400.5 1980 JUN 10.0	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347
JD 2444390.5 1980 MAY 31.0	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267	1267
JD 2444380.5 1980 MAY 21.0	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185	1185
JD 2444370.5 1980 MAY 11.0	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102	1102
JD 2444360.5 1980 MAY 1.0	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020
JD 2444350.5 1980 APR 21.0	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941
JD 2444340.5 1980 APR 11.0	866	866	866	866	866	866	866	866	866	866	866	866	866	866	866	866	866	866	866	866	866
JD 2444330.5 1980 APR 1.0	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798	798
JD 2444320.5 1980 MAR 22.0	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742	742

(FLT T)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)

JD2444800.5 1981 JUL 15.0 — JD2444840.5 1981 AUG 24.0 — JD2444880.5 1981 OCT 3.0 — JD2444920.5 1981 NOV 12.0 — JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E13

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)
JD 2444440.5	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368
1980 JUL 20.0	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678
JD 2444430.5	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376	376
1980 JUL 10.0	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717	717
JD 2444420.5	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383
1980 JUN 30.0	758	758	758	758	758	758	758	758	758	758	758	758	758	758	758	758	758	758	758	758	758
JD 2444410.5	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387
1980 JUN 20.0	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802	802
JD 2444400.5	388	388	388	388	388	388	388	388	388	388	388	388	388	388	388	388	388	388	388	388	388
1980 JUN 10.0	849	849	849	849	849	849	849	849	849	849	849	849	849	849	849	849	849	849	849	849	849
JD 2444390.5	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387
1980 MAY 31.0	899	899	899	899	899	899	899	899	899	899	899	899	899	899	899	899	899	899	899	899	899
JD 2444380.5	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382	382
1980 MAY 21.0	955	955	955	955	955	955	955	955	955	955	955	955	955	955	955	955	955	955	955	955	955
JD 2444370.5	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372
1980 MAY 11.0	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016
JD 2444360.5	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355
1980 MAY 1.0	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084	1084
JD 2444350.5	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332	332
1980 APR 21.0	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160	1160
JD 2444340.5	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299	299
1980 APR 11.0	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247	1247
JD 2444330.5	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254	254
1980 APR 1.0	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345	1345
JD 2444320.5	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
1980 MAR 22.0	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457	1457

(FLT T)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E13

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)
JD 2444440.5	703	799	894	990	1086	1183	1280	1378	1476	1574	1674	1774	1874	1975	2076	2178	2279	2381	2483	2585	2687
1980 JUL 20.0	1541	1508	1474	1442	1411	1381	1352	1324	1298	1274	1252	1232	1214	1198	1185	1175	1167	1163	1161	1162	1167
JD 2444430.5	752	847	943	1039	1135	1232	1329	1426	1525	1623	1723	1823	1923	2024	2125	2226	2328	2430	2532	2634	2735
1980 JUL 10.0	1525	1492	1459	1428	1397	1368	1340	1313	1288	1265	1244	1225	1209	1195	1183	1174	1168	1165	1165	1168	1175
JD 2444420.5	800	895	991	1087	1183	1280	1377	1475	1573	1671	1770	1871	1971	2072	2173	2274	2376	2478	2580	2682	2784
1980 JUN 30.0	1509	1476	1444	1413	1384	1355	1328	1302	1279	1257	1237	1219	1204	1191	1181	1174	1170	1168	1170	1175	1184
JD 2444410.5	848	943	1039	1134	1231	1327	1424	1522	1620	1719	1819	1918	2018	2119	2220	2322	2424	2526	2627	2729	2831
1980 JUN 20.0	1494	1461	1430	1400	1371	1343	1317	1292	1269	1248	1230	1213	1200	1188	1180	1174	1171	1171	1175	1182	1193
JD 2444400.5	894	990	1085	1181	1277	1374	1471	1569	1667	1765	1866	1965	2065	2166	2267	2369	2471	2572	2674	2776	2878
1980 JUN 10.0	1479	1447	1416	1386	1358	1331	1306	1282	1260	1241	1223	1208	1196	1186	1179	1174	1173	1175	1180	1189	1203
JD 2444390.5	941	1036	1132	1228	1324	1420	1517	1615	1713	1815	1912	2011	2112	2212	2314	2415	2517	2619	2721	2822	2924
1980 MAY 31.0	1464	1432	1402	1373	1346	1319	1295	1272	1252	1233	1217	1203	1192	1183	1178	1175	1175	1179	1186	1197	1214
JD 2444380.5	986	1082	1177	1273	1370	1466	1563	1661	1758	1859	1957	2057	2157	2258	2359	2461	2563	2665	2766	2868	2970
1980 MAY 21.0	1449	1418	1389	1360	1333	1308	1284	1263	1243	1225	1211	1198	1188	1181	1177	1175	1177	1182	1192	1205	1225
JD 2444370.5	1032	1127	1223	1319	1415	1511	1608	1706	1813	1904	2003	2103	2203	2304	2405	2506	2608	2710	2812	2914	3015
1980 MAY 11.0	1435	1404	1375	1348	1322	1297	1274	1253	1234	1218	1204	1193	1184	1179	1176	1176	1179	1186	1198	1215	1238
JD 2444360.5	1077	1172	1268	1364	1460	1556	1653	1750	1851	1949	2048	2147	2248	2349	2450	2551	2653	2755	2857	2959	3060
1980 MAY 1.0	1420	1391	1362	1335	1310	1286	1264	1244	1226	1211	1198	1188	1181	1176	1175	1177	1182	1191	1205	1225	1253
JD 2444350.5	1121	1217	1312	1408	1504	1601	1697	1795	1895	1993	2092	2192	2292	2393	2494	2596	2698	2799	2901	3003	3105
1980 APR 21.0	1406	1377	1349	1323	1298	1275	1254	1236	1218	1204	1192	1183	1177	1174	1174	1177	1184	1196	1212	1236	1270
JD 2444340.5	1166	1261	1357	1452	1548	1645	1741	1843	1939	2038	2137	2236	2337	2437	2539	2640	2742	2844	2946	3047	3149
1980 APR 11.0	1392	1364	1336	1310	1286	1264	1244	1225	1210	1197	1186	1178	1174	1172	1173	1178	1187	1201	1221	1249	1289
JD 2444330.5	1210	1305	1401	1496	1592	1689	1779	1886	1983	2082	2181	2280	2381	2482	2583	2684	2786	2888	2990	3091	3193
1980 APR 1.0	1378	1350	1323	1298	1275	1253	1235	1216	1202	1190	1180	1173	1170	1170	1173	1179	1191	1207	1230	1264	1311
JD 2444320.5	1254	1349	1444	1540	1636	1732	1835	1929	2027	2125	2225	2324	2425	2525	2627	2728	2830	2932	3034	3135	3237
1980 MAR 22.0	1364	1336	1310	1286	1263	1242	1223	1207	1193	1182	1174	1168	1166	1167	1172	1181	1194	1214	1242	1281	1337
(FLT T)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E13

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

	(FLT T)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)
JD 2444440.5		25	24	24	24	25	27	30	35	44	61	108	509	182	78	51	38	32	28	25	24	24
1980 JUL 20.0		805	764	722	681	641	603	566	532	501	472	446	423	403	386	372	361	354	350	351	356	366
JD 2444430.5		40	39	39	40	43	47	53	64	84	129	290	987	183	103	73	58	49	44	41	39	39
1980 JUL 10.0		786	744	703	663	624	586	551	519	489	462	437	416	397	382	369	361	355	354	357	364	378
JD 2444420.5		55	54	55	57	61	69	80	100	140	243	1046	439	184	118	89	73	64	58	55	54	55
1980 JUN 30.0		767	726	685	645	607	571	538	506	478	452	429	409	392	378	368	361	358	358	364	375	392
JD 2444410.5		69	69	71	75	82	93	112	147	222	484	2068	335	184	130	102	87	77	72	69	69	70
1980 JUN 20.0		748	708	667	629	592	557	525	495	468	443	422	404	388	376	367	362	361	364	372	387	408
JD 2444400.5		82	83	87	93	104	122	152	210	357	1351	723	290	184	138	113	98	89	84	82	83	86
1980 JUN 10.0		731	690	651	613	577	544	513	484	459	436	416	399	385	375	368	365	365	371	382	400	426
JD 2444390.5		96	98	104	113	129	155	202	301	631	3844	493	265	184	145	122	109	101	96	95	98	103
1980 MAY 31.0		713	674	635	598	564	531	502	475	450	428	410	395	383	374	369	368	371	379	394	415	446
JD 2444380.5		109	113	122	136	158	196	268	448	1478	1058	397	248	185	150	130	118	111	108	109	113	121
1980 MAY 21.0		697	658	620	584	551	520	491	466	443	422	406	392	381	374	371	372	378	389	406	432	469
JD 2444370.5		123	129	141	160	192	247	364	729	6951	663	344	237	185	155	137	126	121	119	122	128	140
1980 MAY 11.0		681	642	606	571	539	509	482	458	434	417	402	390	381	375	374	377	385	399	421	451	493
JD 2444360.5		136	146	162	188	232	315	513	1496	1476	507	310	228	185	159	144	135	130	131	135	145	161
1980 MAY 1.0		665	628	592	559	528	499	474	451	430	413	399	388	381	377	378	383	394	411	436	472	521
JD 2444350.5		151	164	186	221	284	411	787	7359	850	423	287	221	185	163	149	142	140	142	149	162	184
1980 APR 21.0		651	614	580	547	517	490	466	447	425	409	396	387	382	380	382	390	403	424	454	495	551
JD 2444340.5		166	184	213	261	350	557	1456	2033	620	370	269	216	185	166	155	150	149	154	164	181	210
1980 APR 11.0		637	601	568	536	508	482	459	437	420	406	395	387	383	383	388	398	414	439	473	521	585
JD 2444330.5		183	206	244	310	443	814	4969	1058	500	332	254	211	185	169	160	157	159	166	179	202	241
1980 APR 1.0		623	589	556	526	499	474	454	432	416	403	394	387	385	387	394	407	427	455	495	549	622
JD 2444320.5		201	231	282	374	582	1388	2819	735	425	305	243	207	185	172	165	164	168	178	196	226	277
1980 MAR 22.0		610	577	545	517	490	467	445	428	413	401	393	388	388	392	401	417	440	473	519	580	663
	(FLT T)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)

JD2444800.5
1981 JUL 15.0

JD2444840.5
1981 AUG 24.0

JD2444880.5
1981 OCT 3.0

JD2444920.5
1981 NOV 17.0

JD2444960.5
1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E13

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

	(FLT T)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)
JD 2444440.5		-239	-296	-356	-417	-478	-539	-598	-655	-709	-759	-805	-846	-883	-914	-940	-960	-974	-981	983	976	960
1980 JUL 20.0		2217	2215	2209	2201	2190	2178	2165	2150	2135	2120	2105	2090	2077	2065	2055	2047	2042	2041	2044	2052	2068
JD 2444430.5		-267	-326	-387	-448	-510	-570	-628	-683	-735	-783	-827	-866	-900	-928	-951	-968	-978	-982	980	968	946
1980 JUL 10.0		2235	2231	2223	2214	2202	2189	2175	2160	2145	2130	2115	2101	2088	2077	2068	2062	2059	2060	2066	2078	2098
JD 2444420.5		-296	-356	-417	-479	-540	-599	-656	-710	-760	-806	-848	-884	-916	-941	-961	-974	-982	982	974	958	930
1980 JUN 30.0		2252	2246	2237	2227	2214	2200	2186	2170	2155	2140	2125	2112	2100	2090	2082	2077	2076	2080	2089	2106	2131
JD 2444410.5		-325	-386	-448	-509	-570	-628	-684	-736	-784	-828	-868	-901	-930	-952	-969	-979	-983	980	967	945	910
1980 JUN 20.0		2268	2260	2250	2239	2225	2211	2196	2180	2165	2150	2135	2123	2112	2103	2097	2094	2095	2102	2115	2136	2167
JD 2444400.5		-354	-416	-478	-539	-598	-656	-710	-760	-806	-848	-885	-916	-942	-962	-975	-982	983	975	957	929	887
1980 JUN 10.0		2283	2274	2263	2250	2236	2221	2206	2190	2175	2161	2146	2134	2124	2117	2112	2111	2115	2125	2142	2168	2206
JD 2444390.5		-383	-445	-507	-567	-626	-682	-735	-783	-827	-868	-901	-930	-953	-970	-980	-984	980	967	945	910	861
1980 MAY 31.0		2297	2287	2275	2262	2247	2232	2216	2200	2185	2169	2158	2147	2138	2131	2128	2130	2137	2150	2171	2203	2249
JD 2444380.5		-412	-474	-535	-595	-653	-707	-758	-805	-846	-885	-916	-942	-962	-976	-983	984	976	958	930	888	830
1980 MAY 21.0		2311	2300	2287	2273	2258	2242	2226	2211	2196	2181	2169	2159	2151	2146	2146	2149	2159	2176	2202	2241	2295
JD 2444370.5		-441	-502	-563	-622	-678	-731	-780	-825	-869	-900	-929	-953	-970	-981	-985	982	969	947	912	863	795
1980 MAY 11.0		2324	2312	2298	2283	2268	2252	2236	2221	2202	2192	2181	2172	2165	2162	2164	2170	2183	2204	2236	2282	2345
JD 2444360.5		-469	-530	-590	-648	-703	-754	-801	-844	-883	-915	-941	-962	-977	-984	986	978	961	933	892	834	756
1980 MAY 1.0		2336	2323	2309	2293	2278	2262	2246	2231	2216	2204	2193	2185	2180	2179	2182	2192	2209	2234	2272	2326	2400
JD 2444350.5		-496	-557	-616	-673	-727	-776	-821	-858	-898	-928	-952	-970	-982	-986	984	972	950	916	868	802	711
1980 APR 21.0		2348	2334	2319	2303	2287	2271	2256	2245	2226	2215	2205	2199	2195	2196	2202	2215	2235	2267	2311	2374	2460
JD 2444340.5		-523	-583	-642	-697	-749	-797	-840	-880	-913	-940	-962	-977	-985	988	981	964	937	897	841	764	661
1980 APR 11.0		2359	2345	2329	2313	2297	2281	2266	2249	2237	2226	2218	2213	2211	2214	2223	2239	2264	2301	2353	2426	2525
JD 2444330.5		-549	-609	-666	-720	-770	-816	-855	-895	-926	-951	-970	-982	-988	987	976	955	922	876	811	723	605
1980 APR 1.0		2370	2355	2339	2322	2306	2290	2278	2260	2248	2238	2231	2227	2227	2233	2244	2264	2294	2338	2399	2483	2597
JD 2444320.5		-575	-634	-690	-742	-791	-834	-877	-909	-938	-960	-977	-986	-989	984	969	943	905	851	776	675	542
1980 MAR 22.0		2380	2364	2348	2332	2315	2300	2282	2270	2259	2250	2244	2242	2244	2252	2267	2291	2327	2377	2448	2545	2675
	(FLT T)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E13

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)
JD 2444440.5	108	112	116	120	124	129	134	139	145	151	157	164	171	178	185	193	201	210	219	228	238
1980 JUL 20.0	194	199	206	212	218	225	232	240	247	255	263	271	280	288	297	306	315	324	333	342	352
JD 2444430.5	110	114	118	122	126	131	136	142	148	154	160	167	174	181	189	197	205	214	223	233	243
1980 JUL 10.0	198	204	210	216	223	230	237	245	252	260	268	277	285	294	303	311	320	330	339	348	357
JD 2444420.5	112	116	120	124	129	134	139	145	150	157	163	170	177	184	192	200	209	218	227	237	248
1980 JUN 30.0	202	208	214	221	228	235	242	249	257	265	273	282	290	299	308	317	326	335	344	353	363
JD 2444410.5	114	118	122	126	131	136	141	147	153	159	166	173	180	188	196	204	213	222	231	242	254
1980 JUN 20.0	206	212	219	225	232	239	247	254	262	270	279	287	296	304	313	322	331	340	350	359	368
JD 2444400.5	116	120	124	128	133	138	144	150	156	162	169	176	183	191	199	207	216	226	236	247	260
1980 JUN 10.0	210	217	223	230	237	244	252	259	267	275	284	292	301	310	318	327	337	346	355	364	373
JD 2444390.5	118	122	126	131	136	141	146	152	159	165	172	179	187	194	203	211	220	230	241	252	266
1980 MAY 31.0	215	221	228	234	241	249	256	264	272	281	289	297	306	315	324	333	342	351	360	369	379
JD 2444380.5	120	124	128	133	138	143	149	155	161	168	175	182	190	198	206	215	224	234	245	258	273
1980 MAY 21.0	219	225	232	239	246	254	261	269	277	285	294	302	311	320	329	338	347	356	366	375	384
JD 2444370.5	122	126	130	135	140	146	152	158	165	171	178	185	193	201	210	219	228	239	251	264	281
1980 MAY 11.0	223	230	237	244	251	258	266	274	283	290	299	308	316	325	334	343	352	362	371	380	389
JD 2444360.5	124	128	133	138	143	148	154	160	167	174	181	188	196	205	213	223	233	244	256	271	290
1980 MAY 1.0	228	234	241	248	256	263	271	279	287	295	304	313	321	330	339	349	358	367	376	385	394
JD 2444350.5	126	130	135	140	145	151	157	163	170	177	184	192	200	208	217	227	237	249	262	278	300
1980 APR 21.0	232	239	246	253	260	268	276	283	292	301	309	318	327	336	345	354	363	372	381	390	399
JD 2444340.5	128	132	137	142	148	153	159	166	173	180	187	195	203	212	221	231	242	254	268	287	312
1980 APR 11.0	236	243	250	258	265	273	281	289	297	306	314	323	332	341	350	359	368	377	386	395	404
JD 2444330.5	130	135	139	145	150	156	162	169	176	183	190	198	206	215	225	235	246	260	276	296	327
1980 APR 1.0	241	248	255	262	270	278	285	294	302	311	319	328	337	346	355	364	373	382	391	400	409
JD 2444320.5	132	137	142	147	153	159	165	172	179	186	193	201	210	219	229	239	252	266	284	308	346
1980 MAR 22.0	245	252	260	267	275	282	291	299	307	316	324	333	342	351	360	369	378	388	396	405	414

(FLT T)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M17 E13

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)
JD 2444440.5 1980 JUL 20.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1512	1413	1345	1290	1248	1219	1203	1202	1218	1253
JD 2444430.5 1980 JUL 10.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1381	1318	1269	1233	1211	1203	1211	1237	1284
JD 2444420.5 1980 JUN 30.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1434	1351	1294	1251	1222	1207	1207	1225	1263	1324
JD 2444410.5 1980 JUN 20.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1394	1325	1274	1237	1215	1207	1216	1245	1295	1372
JD 2444400.5 1980 JUN 10.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1476	1363	1302	1257	1227	1211	1212	1231	1270	1334	1428
JD 2444390.5 1980 MAY 31.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1417	1336	1282	1243	1220	1212	1221	1250	1302	1381	1495
JD 2444380.5 1980 MAY 21.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1381	1313	1265	1233	1216	1216	1235	1275	1340	1436	1524
JD 2444370.5 1980 MAY 11.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1449	1351	1292	1251	1226	1217	1225	1254	1306	1386	1500	1524
JD 2444360.5 1980 MAY 1.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1403	1327	1275	1240	1222	1221	1238	1278	1343	1438	1524	1524
JD 2444350.5 1980 APR 21.0	1524	1524	1524	1524	1524	1524	1524	1524	1462	1370	1306	1261	1233	1221	1228	1256	1307	1385	1499	1524	1524
JD 2444340.5 1980 APR 11.0	1524	1524	1524	1524	1524	1524	1524	1524	1431	1344	1287	1249	1228	1224	1240	1278	1341	1435	1524	1524	1524
JD 2444330.5 1980 APR 1.0	1524	1524	1524	1524	1524	1524	1524	1524	1395	1321	1272	1241	1227	1231	1256	1305	1381	1492	1524	1524	1524
JD 2444320.5 1980 MAR 22.0	1524	1524	1524	1524	1524	1524	1524	1464	1363	1302	1260	1235	1228	1241	1276	1336	1428	1524	1524	1524	1524

(FLT T)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)
	JD2444800.5 1981 JUL 15.0		JD2444840.5 1981 AUG 24.0			JD2444880.5 1981 OCT 3.0				JD2444920.5 1981 NOV 12.0						JD2444960.5 1981 DEC 22.0					

EARTH DEPARTURE OR ARRIVAL DATE

M17
E13

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

	(FLT T)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)
JD 2444440.5		1428	1252	1084	923	771	628	493	368	252	145	49	0	0	0	0	0	0	0	0	0	0
1980 JUL 20.0		1827	1720	1617	1520	1429	1344	1264	1191	1124	1063	1010	984	914	879	851	829	814	807	808	820	843
JD 2444430.5		1349	1176	1011	854	705	566	435	313	202	100	14	23	0	0	0	0	0	0	0	0	0
1980 JUL 10.0		1759	1655	1556	1463	1375	1293	1217	1148	1085	1029	985	966	890	858	833	815	805	802	809	827	858
JD 2444420.5		1273	1103	941	787	642	506	379	262	155	61	74	0	0	0	0	0	0	0	0	0	0
1980 JUN 30.0		1694	1593	1497	1407	1323	1245	1173	1107	1049	999	1025	905	866	838	817	803	797	800	812	837	876
JD 2444410.5		1200	1033	874	724	582	450	327	214	113	37	319	0	0	0	0	0	0	0	0	0	0
1980 JUN 20.0		1631	1533	1441	1354	1274	1199	1131	1069	1016	981	1105	877	844	820	803	793	791	799	818	849	898
JD 2444400.5		1129	965	809	663	525	396	277	170	78	149	0	0	0	0	0	0	0	0	0	0	0
1980 JUN 10.0		1571	1476	1387	1304	1227	1156	1091	1034	989	1051	904	853	824	803	790	784	787	800	825	865	924
JD 2444390.5		1061	900	748	604	470	345	231	130	64	1014	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 31.0		1514	1422	1336	1256	1182	1115	1054	1003	976	1502	867	830	805	788	778	777	784	803	835	883	954
JD 2444380.5		995	837	688	548	418	298	189	99	191	22	0	0	0	0	0	0	0	0	0	0	47
1980 MAY 21.0		1459	1370	1287	1210	1140	1076	1020	977	1052	917	840	809	788	774	768	771	784	808	848	906	989
JD 2444370.5		931	777	631	495	369	253	152	92	2352	0	0	0	0	0	0	0	0	0	0	0	135
1980 MAY 11.0		1406	1321	1241	1167	1100	1040	989	967	2349	861	816	790	772	762	760	767	785	816	864	932	1030
JD 2444360.5		870	719	577	445	322	212	124	210	133	0	0	0	0	0	0	0	0	0	0	49	236
1980 MAY 1.0		1356	1273	1196	1126	1062	1007	965	1036	956	829	795	772	758	751	753	765	789	827	883	964	1079
JD 2444350.5		811	663	525	396	279	177	119	2521	0	0	0	0	0	0	0	0	0	0	0	133	352
1980 APR 21.0		1308	1228	1154	1087	1027	977	957	2510	861	804	775	756	745	742	748	765	794	840	907	1001	1136
JD 2444340.5		754	610	475	351	239	150	217	312	0	0	0	0	0	0	0	0	0	0	44	229	484
1980 APR 11.0		1263	1185	1114	1050	995	954	1013	1038	821	781	757	741	733	734	745	767	803	857	935	1046	1202
JD 2444330.5		699	558	428	308	204	145	1513	23	0	0	0	0	0	0	0	0	0	0	123	338	634
1980 APR 1.0		1219	1145	1077	1016	966	945	1830	869	792	761	740	728	723	728	743	771	814	878	969	1098	1280
JD 2444320.5		646	509	383	269	178	221	605	0	0	0	0	0	0	0	0	0	0	33	213	462	806
1980 MAR 22.0		1178	1106	1041	985	943	987	1198	817	770	743	725	716	715	724	744	778	829	903	1009	1159	1372

	(FLT T)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)
JD2444800.5																						
1981 JUL 15.0																						
JD2444840.5																						
1981 AUG 24.0																						
JD2444880.5																						
1981 OCT 3.0																						
JD2444920.5																						
1981 NOV 12.0																						
JD2444960.5																						
1981 DEC 22.0																						

EARTH DEPARTURE OR ARRIVAL DATE

M17
E13

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

	(FLT T)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)
JD 2444440.5		3255	2972	2701	2444	2200	1972	1758	1559	1376	1209	1059	984	914	879	851	829	814	807	808	820	843
1980 JUL 20.0		703	799	894	990	1086	1183	1280	1378	1476	1574	1674	1774	1874	1975	2076	2178	2279	2381	2483	2585	2687
JD 2444430.5		3108	2831	2567	2317	2080	1859	1652	1461	1287	1129	1000	988	890	858	833	815	805	802	809	827	858
1980 JUL 10.0		752	847	943	1039	1135	1232	1329	1426	1525	1623	1723	1823	1923	2024	2125	2226	2328	2430	2532	2634	2735
JD 2444420.5		2967	2696	2438	2195	1965	1751	1552	1369	1204	1060	1099	905	866	838	817	803	797	800	812	837	876
1980 JUN 30.0		800	895	991	1087	1183	1280	1377	1475	1573	1671	1770	1871	1971	2072	2173	2274	2376	2478	2580	2682	2784
JD 2444410.5		2831	2566	2315	2078	1856	1649	1458	1283	1129	1018	1424	877	844	820	803	793	791	799	818	849	898
1980 JUN 20.0		848	943	1039	1134	1231	1327	1424	1522	1620	1719	1819	1918	2018	2119	2220	2322	2424	2526	2627	2729	2831
JD 2444400.5		2700	2442	2197	1967	1751	1552	1369	1204	1066	1200	904	853	824	803	790	784	787	800	825	865	924
1980 JUN 10.0		894	990	1085	1181	1277	1374	1471	1569	1667	1765	1866	1965	2065	2166	2267	2369	2471	2572	2674	2776	2878
JD 2444390.5		2574	2322	2084	1860	1652	1460	1285	1133	1040	2517	867	830	805	788	778	777	784	803	835	883	954
1980 MAY 31.0		941	1036	1132	1228	1324	1420	1517	1615	1713	1815	1912	2011	2112	2212	2314	2415	2517	2619	2721	2822	2924
JD 2444380.5		2454	2207	1975	1759	1558	1374	1209	1077	1243	939	840	809	788	774	768	771	784	808	848	906	1036
1980 MAY 21.0		986	1082	1177	1273	1370	1466	1563	1661	1758	1859	1957	2057	2157	2258	2359	2461	2563	2665	2766	2868	2970
JD 2444370.5		2337	2097	1872	1662	1469	1293	1141	1059	4701	861	816	790	772	762	760	767	785	816	864	932	1166
1980 MAY 11.0		1032	1127	1223	1319	1415	1511	1608	1706	1813	1904	2003	2103	2203	2304	2405	2506	2608	2710	2812	2914	3015
JD 2444360.5		2226	1992	1773	1570	1385	1219	1089	1246	1089	829	795	772	758	751	753	765	789	827	883	1013	1315
1980 MAY 1.0		1077	1172	1268	1364	1460	1556	1653	1750	1851	1949	2048	2147	2248	2349	2450	2551	2653	2755	2857	2959	3060
JD 2444350.5		2119	1891	1679	1483	1306	1154	1076	5030	86.	804	775	756	745	742	748	765	794	840	907	1134	1487
1980 APR 21.0		1121	1217	1312	1408	1504	1601	1697	1785	1895	1993	2092	2192	2292	2393	2494	2596	2698	2799	2901	3003	3105
JD 2444340.5		2016	1795	1590	1401	1234	1104	1230	1350	821	781	757	741	733	734	745	767	803	857	979	1274	1686
1980 APR 11.0		1166	1261	1357	1452	1548	1645	1741	1843	1939	2038	2137	2236	2337	2437	2539	2640	2742	2844	2946	3047	3149
JD 2444330.5		1918	1703	1504	1325	1170	1089	3343	892	793	761	740	728	723	728	743	771	814	878	1092	1435	1914
1980 APR 1.0		1210	1305	1401	1496	1592	1689	1779	1886	1981	2082	2181	2280	2381	2482	2583	2684	2786	2888	2990	3091	3193
JD 2444320.5		1824	1615	1424	1254	1121	1208	1803	817	770	743	725	716	715	724	744	778	829	937	1222	1621	2178
1980 MAR 22.0		1254	1349	1444	1540	1636	1732	1835	1929	2027	2125	2225	2324	2425	2525	2627	2728	2830	2932	3034	3135	3237
	(FLT T)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

M17
E14

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444760.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671698	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.621	DEGREES
MEAN ANOM. AT EPOCH	=	150.720	DEGREES
DATE OF NODAL PASSAGE	=	2444870.617	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444760.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338832	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.414	DEGREES
ARG. OF PERIHELION	=	286.303	DEGREES
MEAN ANOM. AT EPOCH	=	64.167	DEGREES
DATE OF NODAL PASSAGE	=	2444759.489	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.067	DEGREES

M17
E14

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

	(FLT T)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)
JD 2444440.5		196	235	285	349	431	537	680	877	1141	1452	1497	1439	1380	1321	1262	0	0	0	0	0	0
1980 JUL 20.0		360	374	395	424	467	527	614	740	914	1122	1149	1115	1080	1045	1010	0	0	0	0	0	0
JD 2444430.5		218	263	321	394	488	612	781	1010	1301	1528	1470	1412	1352	1293	0	0	0	0	0	0	0
1980 JUL 10.0		366	383	408	444	495	567	671	819	1012	1157	1123	1089	1054	1019	0	0	0	0	0	0	0
JD 2444420.5		243	295	361	445	553	698	894	1155	1457	1503	1444	1385	1325	0	0	0	0	0	0	0	0
1980 JUN 30.0		372	393	424	466	527	613	737	906	1105	1132	1099	1063	1028	0	0	0	0	0	0	0	0
JD 2444410.5		271	331	405	501	626	794	1021	1306	0	1477	1418	1358	0	0	0	0	0	0	0	0	0
1980 JUN 20.0		380	405	441	492	564	667	811	996	0	1107	1072	1038	0	0	0	0	0	0	0	0	0
JD 2444400.5		303	369	454	563	708	902	1158	1454	1511	1452	1392	0	0	0	0	0	0	0	0	0	0
1980 JUN 10.0		389	419	462	522	607	728	891	1084	1116	1082	1048	0	0	0	0	0	0	0	0	0	0
JD 2444390.5		337	412	508	633	800	1023	1301	0	1486	1426	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 31.0		400	436	486	557	657	797	975	0	1092	1058	0	0	0	0	0	0	0	0	0	0	0
JD 2444380.5		374	459	568	711	903	1152	1442	1520	1460	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 21.0		413	455	513	597	714	871	1058	1103	1069	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444370.5		415	510	634	798	1016	1288	0	1495	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 11.0		427	476	545	643	777	950	0	1080	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444360.5		459	567	708	896	1140	1425	1530	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 1.0		445	502	583	695	848	1029	1091	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444350.5		508	630	791	1003	1269	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 21.0		465	532	625	755	923	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444340.5		562	700	883	1121	1401	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 11.0		488	566	675	821	999	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444330.5		622	779	985	1246	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 1.0		516	606	731	893	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444320.5		688	866	1097	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 22.0		548	652	794	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(FLT T)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)	(770)	(780)	(790)	(800)	(810)	(820)	(830)	(840)	(850)	(860)	(870)	(880)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E14

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)
JD 2444440.5	14	22	22	15	6	-3	-12	-16	-12	-2	233	233	228	219	207	0	0	0	0	0	0
1980 JUL 20.0	1802	1778	1775	1786	1805	1827	1845	1853	1844	1817	878	956	1034	1110	1186	0	0	0	0	0	0
JD 2444430.5	50	51	46	37	26	16	9	7	14	229	233	232	228	221	0	0	0	0	0	0	0
1980 JUL 10.0	1738	1726	1731	1748	1769	1790	1804	1805	1787	786	864	942	1020	1096	0	0	0	0	0	0	0
JD 2444420.5	79	76	67	56	45	36	30	32	41	227	232	232	229	0	0	0	0	0	0	0	0
1980 JUN 30.0	1682	1680	1692	1712	1734	1752	1761	1753	1730	772	850	928	1006	0	0	0	0	0	0	0	0
JD 2444410.5	104	97	86	74	63	55	53	57	0	226	231	232	0	0	0	0	0	0	0	0	0
1980 JUN 20.0	1632	1638	1655	1677	1698	1713	1715	1700	0	759	837	914	0	0	0	0	0	0	0	0	0
JD 2444400.5	125	115	103	91	81	75	75	82	215	224	229	0	0	0	0	0	0	0	0	0	0
1980 JUN 10.0	1587	1599	1620	1642	1662	1672	1666	1645	668	745	823	0	0	0	0	0	0	0	0	0	0
JD 2444390.5	143	131	119	108	99	95	98	0	212	222	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 31.0	1546	1563	1586	1608	1624	1627	1614	0	655	732	0	0	0	0	0	0	0	0	0	0	0
JD 2444380.5	158	146	134	123	116	115	120	195	210	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 21.0	1507	1528	1552	1572	1583	1580	1561	567	643	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444370.5	172	160	148	139	134	135	0	192	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 11.0	1471	1494	1517	1535	1540	1529	0	554	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444360.5	184	172	162	154	152	154	171	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 1.0	1436	1460	1482	1495	1493	1477	468	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444350.5	196	184	175	169	169	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 21.0	1402	1426	1445	1452	1444	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444340.5	206	195	188	184	185	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 11.0	1368	1391	1406	1406	1392	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444330.5	215	206	200	198	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 1.0	1334	1354	1363	1357	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444320.5	224	217	212	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 22.0	1299	1315	1318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(FLT T)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)	(770)	(780)	(790)	(800)	(810)	(820)	(830)	(840)	(850)	(860)	(870)	(880)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

M17
E14

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

	(FLT T)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)
JD 2444440.5		-158	-160	-163	-168	-175	-183	-194	-208	-223	-234	-239	-237	-235	-233	-230	0	0	0	0	0	0
1980 JUL 20.0		3065	3060	3052	3041	3025	3002	2968	2917	2840	2734	2740	2762	2785	2807	2828	0	0	0	0	0	0
JD 2444430.5		-170	-172	-176	-180	-187	-196	-206	-218	-229	-240	-239	-238	-237	-235	0	0	0	0	0	0	0
1980 JUL 10.0		3015	3008	2998	2984	2964	2935	2892	2828	2735	2675	2698	2720	2743	2765	0	0	0	0	0	0	0
JD 2444420.5		-181	-183	-186	-191	-197	-205	-215	-224	-229	-239	-239	-238	-237	0	0	0	0	0	0	0	0
1980 JUN 30.0		2964	2955	2942	2924	2899	2863	2810	2732	2628	2633	2656	2679	2701	0	0	0	0	0	0	0	0
JD 2444410.5		-189	-191	-195	-199	-205	-212	-219	-224	0	-236	-237	-237	0	0	0	0	0	0	0	0	0
1980 JUN 20.0		2912	2900	2885	2863	2832	2787	2722	2631	0	2592	2615	2638	0	0	0	0	0	0	0	0	0
JD 2444400.5		-196	-198	-201	-205	-210	-215	-219	-217	-231	-233	-234	0	0	0	0	0	0	0	0	0	0
1980 JUN 10.0		2858	2844	2825	2799	2761	2707	2630	2529	2529	2552	2574	0	0	0	0	0	0	0	0	0	0
JD 2444390.5		-202	-203	-205	-208	-212	-214	-212	0	-227	-229	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 31.0		2804	2787	2764	2732	2687	2622	2534	0	2489	2512	0	0	0	0	0	0	0	0	0	0	0
JD 2444380.5		-205	-206	-207	-209	-210	-208	-200	-218	-221	0	0	0	0	0	0	0	0	0	0	0	0
I980 MAY 21.0		2748	2728	2701	2663	2609	2533	2437	2427	2450	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444370.5		-206	-206	-206	-206	-203	-196	0	-210	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 11.0		2692	2668	2636	2591	2527	2442	0	2389	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444360.5		-205	-203	-202	-199	-192	-179	-198	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 1.0		2634	2606	2568	2516	2443	2350	2329	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444350.5		-201	-198	-195	-188	-176	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 21.0		2575	2543	2499	2438	2356	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444340.5		-195	-191	-184	-173	-155	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 11.0		2515	2478	2427	2357	2268	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444330.5		-187	-180	-169	-153	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 1.0		2453	2411	2352	2274	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444320.5		-175	-165	-151	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 22.0		2390	2342	2275	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	(FLT T)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)	(770)	(780)	(790)	(800)	(810)	(820)	(830)	(840)	(850)	(860)	(870)	(880)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E14

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)
JD 2444440.5 1980 JUL 20.0	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	0	0	0	0	0	0
JD 2444430.5 1980 JUL 10.0	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	1571	0	0	0	0	0	0
JD 2444420.5 1980 JUN 30.0	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	0	0	0	0	0	0	0
JD 2444410.5 1980 JUN 20.0	1425	1425	1425	1425	1425	1425	1425	1425	0	1425	1425	1425	0	0	0	0	0	0	0	0	0
JD 2444400.5 1980 JUN 10.0	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	1347	0	0	0	0	0	0	0	0	0	0
JD 2444390.5 1980 MAY 31.0	1267	1267	1267	1267	1267	1267	1267	0	1267	1267	0	0	0	0	0	0	0	0	0	0	0
JD 2444380.5 1980 MAY 21.0	1185	1185	1185	1185	1185	1185	1185	1185	1185	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444370.5 1980 MAY 11.0	1102	1102	1102	1102	1102	1102	0	1102	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444360.5 1980 MAY 1.0	1020	1020	1020	1020	1020	1020	1020	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444350.5 1980 APR 21.0	941	941	941	941	941	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444340.5 1980 APR 11.0	866	866	866	866	866	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444330.5 1980 APR 1.0	798	798	798	798	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444320.5 1980 MAR 22.0	742	742	742	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(FLT T)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)	(770)	(780)	(790)	(800)	(810)	(820)	(830)	(840)	(850)	(860)	(870)	(880)

JD2445000.5 1982 JAN 31.0 JD2445040.5 1982 MAR 12.0 JD2445080.5 1982 APR 21.0 JD2445120.5 1982 MAY 31.0 JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E14

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)
D 2444440.5	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	0	0	0	0	0	0
980 JUL 20.0	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	0	0	0	0	0	0
D 2444430.5	376	376	376	376	376	376	376	376	376	376	376	376	376	376	0	0	0	0	0	0	0
980 JUL 10.0	717	717	717	717	717	717	717	717	717	717	717	717	717	717	0	0	0	0	0	0	0
D 2444420.5	383	383	383	383	383	383	383	383	383	383	383	383	383	0	0	0	0	0	0	0	0
980 JUN 30.0	758	758	758	758	758	758	758	758	758	758	758	758	758	0	0	0	0	0	0	0	0
D 2444410.5	387	387	387	387	387	387	387	387	0	387	387	387	0	0	0	0	0	0	0	0	0
980 JUN 20.0	802	802	802	802	802	802	802	802	0	802	802	802	0	0	0	0	0	0	0	0	0
D 2444400.5	388	388	388	388	388	388	388	388	388	388	388	0	0	0	0	0	0	0	0	0	0
980 JUN 10.0	849	849	849	849	849	849	849	849	849	849	849	0	0	0	0	0	0	0	0	0	0
D 2444390.5	387	387	387	387	387	387	387	0	387	387	0	0	0	0	0	0	0	0	0	0	0
980 MAY 31.0	899	899	899	899	899	899	899	0	899	899	0	0	0	0	0	0	0	0	0	0	0
D 2444380.5	382	382	382	382	382	382	382	382	382	0	0	0	0	0	0	0	0	0	0	0	0
980 MAY 21.0	955	955	955	955	955	955	955	955	955	0	0	0	0	0	0	0	0	0	0	0	0
D 2444370.5	372	372	372	372	372	372	0	372	0	0	0	0	0	0	0	0	0	0	0	0	0
980 MAY 11.0	1016	1016	1016	1016	1016	1016	0	1016	0	0	0	0	0	0	0	0	0	0	0	0	0
D 2444360.5	355	355	355	355	355	355	355	0	0	0	0	0	0	0	0	0	0	0	0	0	0
980 MAY 1.0	1084	1084	1084	1084	1084	1084	1084	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D 2444350.5	332	332	332	332	332	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
980 APR 21.0	1160	1160	1160	1160	1160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D 2444340.5	299	299	299	299	299	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
980 APR 11.0	1247	1247	1247	1247	1247	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D 2444330.5	254	254	254	254	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
980 APR 1.0	1345	1345	1345	1345	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D 2444320.5	198	198	198	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
980 MAR 22.0	1457	1457	1457	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(FLT T)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)	(770)	(780)	(790)	(800)	(810)	(820)	(830)	(840)	(850)	(860)	(870)	(880)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E14

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)
JD 2444440.5	2687	2788	2889	2990	3090	3189	3288	3387	3484	3582	79	175	271	367	462	0	0	0	0	0	0
1980 JUL 20.0	1167	1175	1189	1208	1236	1277	1338	1431	1571	1761	1768	1728	1689	1649	1610	0	0	0	0	0	0
JD 2444430.5	2735	2837	2938	3038	3138	3238	3337	3435	3533	31	127	224	320	416	0	0	0	0	0	0	0
1980 JUL 10.0	1175	1186	1202	1226	1260	1310	1385	1500	1664	1787	1748	1708	1669	1630	0	0	0	0	0	0	0
JD 2444420.5	2784	2885	2986	3086	3187	3286	3385	3483	3581	79	176	272	368	0	0	0	0	0	0	0	0
1980 JUN 30.0	1184	1197	1217	1245	1287	1348	1441	1578	1760	1768	1728	1689	1650	0	0	0	0	0	0	0	0
JD 2444410.5	2831	2932	3033	3134	3234	3333	3432	3531	0	126	223	319	0	0	0	0	0	0	0	0	0
1980 JUN 20.0	1193	1210	1233	1268	1318	1393	1505	1664	0	1749	1709	1670	0	0	0	0	0	0	0	0	0
JD 2444400.5	2878	2979	3080	3181	3281	3380	3479	3576	76	173	270	0	0	0	0	0	0	0	0	0	0
1980 JUN 10.0	1203	1223	1251	1293	1354	1445	1578	1753	1769	1730	1691	0	0	0	0	0	0	0	0	0	0
JD 2444390.5	2924	3025	3126	3227	3327	3426	3525	0	122	219	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 31.0	1214	1238	1272	1321	1395	1505	1659	0	1751	1711	0	0	0	0	0	0	0	0	0	0	0
JD 2444380.5	2970	3071	3172	3273	3373	3472	3570	71	168	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 21.0	1225	1254	1295	1355	1444	1573	1742	1772	1732	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444370.5	3015	3117	3218	3318	3418	3517	0	116	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 11.0	1238	1272	1321	1393	1500	1648	0	1754	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444360.5	3060	3161	3262	3363	3463	3561	63	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 1.0	1253	1293	1352	1438	1563	1727	1775	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444350.5	3105	3206	3307	3407	3507	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 21.0	1270	1318	1388	1490	1634	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444340.5	3149	3250	3351	3451	3550	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 11.0	1289	1346	1430	1550	1709	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444330.5	3193	3294	3395	3495	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 1.0	1311	1379	1478	1616	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444320.5	3237	3338	3439	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 22.0	1337	1417	1534	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(FLT T)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)	(770)	(780)	(790)	(800)	(810)	(820)	(830)	(840)	(850)	(860)	(870)	(880)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

M17
E14

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

	(FLT T)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)
JD 2444440.5		23	24	25	27	30	36	45	65	117	735	172	78	52	39	33	0	0	0	0	0	0
1980 JUL 20.0		366	383	408	444	494	562	657	780	915	997	999	993	983	970	953	0	0	0	0	0	0
JD 2444430.5		39	40	43	47	54	66	88	138	335	727	177	102	74	59	0	0	0	0	0	0	0
1980 JUL 10.0		378	400	430	473	532	613	721	853	970	1000	996	988	977	962	0	0	0	0	0	0	0
JD 2444420.5		55	57	62	69	82	104	148	267	1617	394	179	118	90	0	0	0	0	0	0	0	0
1980 JUN 30.0		392	418	455	505	575	669	789	919	997	999	993	983	970	0	0	0	0	0	0	0	0
JD 2444410.5		70	75	82	94	115	153	238	568	0	313	181	129	0	0	0	0	0	0	0	0	0
1980 JUN 20.0		408	439	483	542	623	729	857	970	0	996	989	977	0	0	0	0	0	0	0	0	0
JD 2444400.5		86	93	104	123	156	220	393	2035	623	277	181	0	0	0	0	0	0	0	0	0	0
1980 JUN 10.0		426	463	514	583	675	793	919	996	999	993	983	0	0	0	0	0	0	0	0	0	0
JD 2444390.5		103	113	130	157	208	320	734	0	451	255	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 31.0		446	489	548	628	732	857	967	0	997	989	0	0	0	0	0	0	0	0	0	0	0
JD 2444380.5		121	135	159	199	279	487	2071	879	373	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 21.0		469	519	587	677	792	915	994	999	994	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444370.5		140	160	193	253	382	829	0	595	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 11.0		493	551	629	731	852	962	0	997	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444360.5		161	188	234	323	549	1929	1191	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 1.0		521	587	676	787	908	991	999	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444350.5		184	220	286	424	867	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 21.0		551	627	726	844	955	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444340.5		210	260	354	581	1732	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 11.0		585	671	779	898	986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444330.5		241	308	448	864	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 1.0		622	718	833	945	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444320.5		277	371	591	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 22.0		663	768	886	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(FLT T)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)	(770)	(780)	(790)	(800)	(810)	(820)	(830)	(840)	(850)	(860)	(870)	(880)

JD2445000.5
1982 JAN 31.0

JD2445040.5
1982 MAR 12.0

JD2445080.5
1982 APR 21.0

JD2445120.5
1982 MAY 31.0

JD2445160.5
1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E14

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)
JD 2444440.5	960	934	895	840	764	659	517	332	129	4	-1	-11	-27	-50	-78	0	0	0	0	0	0
1980 JUL 20.0	2068	2093	2128	2180	2252	2354	2494	2681	2892	3037	3246	3268	3285	3298	3306	0	0	0	0	0	0
JD 2444430.5	946	913	866	800	710	586	422	224	46	0	-5	-18	-38	-64	0	0	0	0	0	0	0
1980 JUL 10.0	2098	2129	2173	2235	2322	2443	2606	2810	3001	3249	3273	3293	3308	3319	0	0	0	0	0	0	0
JD 2444420.5	930	890	833	755	648	505	321	124	4	-1	-11	-27	-50	0	0	0	0	0	0	0	0
1980 JUN 30.0	2131	2169	2222	2296	2399	2541	2726	2932	3071	3278	3300	3317	3330	0	0	0	0	0	0	0	0
JD 2444410.5	910	862	794	702	578	415	219	47	0	-5	-18	-38	0	0	0	0	0	0	0	0	0
1980 JUN 20.0	2167	2212	2276	2364	2486	2649	2849	3035	0	3306	3325	3340	0	0	0	0	0	0	0	0	0
JD 2444400.5	887	830	750	643	500	319	125	6	-1	-11	-27	0	0	0	0	0	0	0	0	0	0
1980 JUN 10.0	2206	2260	2335	2439	2580	2763	2965	3104	3310	3332	3349	0	0	0	0	0	0	0	0	0	0
JD 2444390.5	861	793	701	577	415	222	51	0	-5	-18	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 31.0	2249	2312	2401	2522	2683	2880	3064	0	3337	3357	0	0	0	0	0	0	0	0	0	0	0
JD 2444380.5	830	751	644	502	324	133	9	-1	-10	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 21.0	2295	2370	2473	2613	2793	2992	3134	3341	3363	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444370.5	795	704	581	422	232	60	0	-4	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 11.0	2345	2433	2552	2711	2905	3089	0	3368	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444360.5	756	650	511	335	145	14	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 1.0	2400	2502	2639	2815	3013	3161	3372	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444350.5	711	591	434	247	72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 21.0	2460	2577	2733	2923	3110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444340.5	661	525	352	162	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 11.0	2525	2659	2833	3029	3185	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444330.5	605	452	267	88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 1.0	2597	2749	2937	3126	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444320.5	542	373	183	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 22.0	2675	2845	3040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(FLT T)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)	(770)	(780)	(790)	(800)	(810)	(820)	(830)	(840)	(850)	(860)	(870)	(880)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E14

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)
JD 2444440.5	238	249	261	275	294	319	361	447	711	4165	115	116	117	118	119	0	0	0	0	0	0
1980 JUL 20.0	352	361	370	379	388	397	405	413	419	423	264	267	269	273	276	0	0	0	0	0	0
JD 2444430.5	243	255	268	284	305	338	397	542	1189	115	115	116	117	118	0	0	0	0	0	0	0
1980 JUL 10.0	357	366	376	385	393	402	410	417	422	264	266	269	272	275	0	0	0	0	0	0	0
JD 2444420.5	248	261	275	294	320	363	453	725	4077	115	116	116	118	0	0	0	0	0	0	0	0
1980 JUN 30.0	363	372	381	390	399	407	414	421	425	266	268	271	274	0	0	0	0	0	0	0	0
JD 2444410.5	254	267	284	306	339	399	546	1181	0	115	116	117	0	0	0	0	0	0	0	0	0
1980 JUN 20.0	368	377	386	395	404	412	418	424	0	268	270	273	0	0	0	0	0	0	0	0	0
JD 2444400.5	260	274	293	320	364	453	720	3441	115	115	116	0	0	0	0	0	0	0	0	0	0
1980 JUN 10.0	373	382	391	400	408	416	422	426	267	270	273	0	0	0	0	0	0	0	0	0	0
JD 2444390.5	266	282	305	338	398	541	1125	0	115	116	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 31.0	379	388	397	405	413	420	425	0	269	272	0	0	0	0	0	0	0	0	0	0	0
JD 2444380.5	273	292	318	362	449	699	2739	115	115	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 21.0	384	393	401	410	417	424	428	269	271	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444370.5	281	303	336	394	529	1042	0	115	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 11.0	389	398	406	414	421	427	0	271	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444360.5	290	316	358	441	667	2164	115	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 1.0	394	403	411	419	425	429	271	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444350.5	300	332	388	512	949	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 21.0	399	408	416	423	428	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444340.5	312	352	430	631	1733	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 11.0	404	412	420	426	431	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444330.5	327	379	492	859	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 1.0	409	417	424	430	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444320.5	346	417	594	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 22.0	414	421	428	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(FLT T)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)	(770)	(780)	(790)	(800)	(810)	(820)	(830)	(840)	(850)	(860)	(870)	(880)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE — EARTH - MARS TRAJECTORY PARAMETERS — M17 E14

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)
JD 2444440.5 1980 JUL 20.0	1253	1310	1396	1520	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	0	0	0	0	0	0
JD 2444430.5 1980 JUL 10.0	1284	1358	1464	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	0	0	0	0	0	0	0
JD 2444420.5 1980 JUN 30.0	1324	1415	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	0	0	0	0	0	0	0	0
JD 2444410.5 1980 JUN 20.0	1372	1483	1524	1524	1524	1524	1524	1524	0	1524	1524	1524	0	0	0	0	0	0	0	0	0
JD 2444400.5 1980 JUN 10.0	1428	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	0	0	0	0	0	0	0	0	0	0
JD 2444390.5 1980 MAY 31.0	1495	1524	1524	1524	1524	1524	1524	0	1524	1524	0	0	0	0	0	0	0	0	0	0	0
JD 2444380.5 1980 MAY 21.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444370.5 1980 MAY 11.0	1524	1524	1524	1524	1524	1524	0	1524	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444360.5 1980 MAY 1.0	1524	1524	1524	1524	1524	1524	1524	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444350.5 1980 APR 21.0	1524	1524	1524	1524	1524	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444340.5 1980 APR 11.0	1524	1524	1524	1524	1524	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444330.5 1980 APR 1.0	1524	1524	1524	1524	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444320.5 1980 MAR 22.0	1524	1524	1524	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(FLT T)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)	(770)	(780)	(790)	(800)	(810)	(820)	(830)	(840)	(850)	(860)	(870)	(880)

JD2445000.5 1982 JAN 31.0 — JD2445040.5 1982 MAR 12.0 — JD2445080.5 1982 APR 21.0 — JD2445120.5 1982 MAY 31.0 — JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

M17
E14

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)
JD 2444440.5	0	0	0	0	172	422	785	1313	2050	2940	3070	2902	2733	2563	2395	0	0	0	0	0	0
1980 JUL 20.0	843	882	939	1022	1141	1313	1563	1928	2439	3051	3132	3030	2927	2823	2720	0	0	0	0	0	0
JD 2444430.5	0	0	0	91	305	610	1051	1681	2506	3161	2994	2824	2654	2484	0	0	0	0	0	0	0
1980 JUL 10.0	858	906	976	1077	1220	1428	1730	2161	2726	3156	3055	2953	2850	2747	0	0	0	0	0	0	0
JD 2444420.5	0	0	21	203	462	831	1361	2089	2956	3087	2918	2747	2576	0	0	0	0	0	0	0	0
1980 JUN 30.0	876	935	1020	1140	1312	1562	1921	2416	3003	3080	2979	2877	2774	0	0	0	0	0	0	0	0
JD 2444410.5	0	0	115	334	645	1088	1712	2519	0	3013	2842	2671	0	0	0	0	0	0	0	0	0
1980 JUN 20.0	898	969	1070	1213	1419	1717	2137	2680	0	3006	2905	2803	0	0	0	0	0	0	0	0	0
JD 2444400.5	0	38	225	487	858	1384	2099	2945	3110	2939	2767	0	0	0	0	0	0	0	0	0	0
1980 JUN 10.0	924	1008	1128	1299	1544	1894	2372	2938	3034	2934	2832	0	0	0	0	0	0	0	0	0	0
JD 2444390.5	0	130	351	663	1103	1717	2506	0	3037	2866	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 31.0	954	1054	1195	1398	1688	2094	2619	0	2963	2862	0	0	0	0	0	0	0	0	0	0	0
JD 2444380.5	47	235	498	866	1384	2083	2913	3136	2965	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 21.0	989	1107	1274	1513	1852	2314	2862	2994	2894	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444370.5	135	357	666	1100	1700	2470	0	3065	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 11.0	1030	1169	1366	1646	2038	2545	0	2927	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444360.5	236	496	859	1365	2047	2861	3166	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 1.0	1079	1241	1472	1799	2244	2778	2961	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444350.5	352	656	1080	1664	2416	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 21.0	1136	1326	1596	1973	2464	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444340.5	484	838	1330	1993	2795	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 11.0	1202	1424	1739	2167	2690	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444330.5	634	1046	1613	2348	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 1.0	1280	1539	1902	2378	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444320.5	806	1283	1927	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 22.0	1372	1673	2086	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(FLT T)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)	(770)	(780)	(790)	(800)	(810)	(820)	(830)	(840)	(850)	(860)	(870)	(880)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M17
E14

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)
JD 2444440.5	843	882	939	1022	1313	1735	2348	3241	4489	5991	6201	5932	5660	5387	5114	0	0	0	0	0	0
1980 JUL 20.0	2687	2788	2889	2990	3090	3189	3288	3387	3484	3582	79	175	271	367	462	0	0	0	0	0	0
JD 2444430.5	858	906	976	1168	1525	2038	2781	3842	5232	6317	6048	5777	5504	5231	0	0	0	0	0	0	0
1980 JUL 10.0	2735	2837	2938	3038	3138	3238	3337	3435	3533	31	127	224	320	416	0	0	0	0	0	0	0
JD 2444420.5	876	935	1040	1343	1774	2393	3282	4505	5959	6168	5897	5624	5351	0	0	0	0	0	0	0	0
1980 JUN 30.0	2784	2885	2986	3086	3187	3286	3385	3483	3581	79	176	272	368	0	0	0	0	0	0	0	0
JD 2444410.5	898	969	1185	1548	2064	2805	3849	5200	0	6019	5747	5473	0	0	0	0	0	0	0	0	0
1980 JUN 20.0	2831	2932	3033	3134	3234	3333	3432	3531	0	126	223	319	0	0	0	0	0	0	0	0	0
JD 2444400.5	924	1046	1352	1785	2401	3278	4471	5884	6144	5873	5599	0	0	0	0	0	0	0	0	0	0
1980 JUN 10.0	2878	2979	3080	3181	3281	3380	3479	3576	76	173	270	0	0	0	0	0	0	0	0	0	0
JD 2444390.5	954	1183	1547	2061	2791	3811	5125	0	6001	5728	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 31.0	2924	3025	3126	3227	3327	3426	3525	0	122	219	0	0	0	0	0	0	0	0	0	0	0
JD 2444380.5	1036	1342	1772	2379	3236	4397	5775	6130	5859	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 21.0	2970	3071	3172	3273	3373	3472	3570	71	168	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444370.5	1166	1526	2032	2746	3738	5015	0	5992	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 11.0	3015	3117	3218	3318	3418	3517	0	116	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444360.5	1315	1737	2331	3164	4290	5640	6127	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAY 1.0	3060	3161	3262	3363	3463	3561	63	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444350.5	1487	1981	2675	3637	4880	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 21.0	3105	3206	3307	3407	3507	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444340.5	1686	2262	3069	4160	5485	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 11.0	3149	3250	3351	3451	3550	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444330.5	1914	2586	3515	4726	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 APR 1.0	3193	3294	3395	3495	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JD 2444320.5	2178	2956	4013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980 MAR 22.0	3237	3338	3439	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(FLT T)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)	(770)	(780)	(790)	(800)	(810)	(820)	(830)	(840)	(850)	(860)	(870)	(880)

JD2445000.5 1982 JAN 31.0 JD2445040.5 1982 MAR 12.0 JD2445080.5 1982 APR 21.0 JD2445120.5 1982 MAY 31.0 JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

M18
E09

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444280.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671752	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.598	DEGREES
MEAN ANOM. AT EPOCH	=	37.632	DEGREES
DATE OF NODAL PASSAGE	=	2444505.380	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444280.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338708	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.404	DEGREES
ARG. OF PERIHELION	=	286.269	DEGREES
MEAN ANOM. AT EPOCH	=	172.637	DEGREES
DATE OF NODAL PASSAGE	=	2444072.523	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.061	DEGREES

M18
E09

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)
JD 2444560.5	0	0	0	0	0	0	0	0	0	0	506	400	325	268	223	187	157	134	117	108	108
1980 NOV 17.0	0	0	0	0	0	0	0	0	0	0	375	298	246	209	183	164	150	140	134	130	130
JD 2444550.5	0	0	0	0	0	0	0	0	0	567	445	359	296	246	206	174	147	126	112	106	109
1980 NOV 7.0	0	0	0	0	0	0	0	0	0	410	320	259	217	186	164	148	136	128	123	120	120
JD 2444540.5	0	0	0	0	0	0	0	0	639	497	399	327	272	229	193	163	139	120	108	105	111
1980 OCT 28.0	0	0	0	0	0	0	0	0	454	347	276	227	192	166	148	134	124	117	113	111	112
JD 2444530.5	0	0	0	0	0	0	0	725	558	444	363	302	253	214	182	155	132	116	106	104	113
1980 OCT 18.0	0	0	0	0	0	0	0	509	382	298	241	200	171	149	134	122	114	108	105	104	105
JD 2444520.5	0	0	0	0	0	0	826	630	497	404	335	281	238	203	173	148	127	112	104	104	116
1980 OCT 8.0	0	0	0	0	0	0	576	426	327	259	212	178	153	135	122	112	105	100	98	97	99
JD 2444510.5	0	0	0	0	0	945	715	558	450	372	312	265	226	193	166	142	123	109	102	105	120
1980 SEP 28.0	0	0	0	0	0	657	480	362	283	227	188	159	136	123	112	104	98	95	93	92	95
JD 2444500.5	0	0	0	0	1080	815	630	504	414	346	294	251	216	186	160	138	120	107	102	106	125
1980 SEP 18.0	0	0	0	0	750	546	406	312	247	201	168	143	125	113	104	97	93	91	89	89	93
JD 2444490.5	0	0	0	1228	931	715	566	461	385	326	279	241	208	180	156	135	118	106	101	106	137
1980 SEP 8.0	0	0	0	853	625	460	348	272	218	179	150	130	115	105	98	94	91	89	88	88	96
JD 2444480.5	0	0	1379	1065	814	638	516	428	362	310	268	233	203	176	153	133	117	105	101	107	219
1980 AUG 29.0	0	0	958	716	526	393	302	239	193	160	136	119	108	100	95	92	91	90	90	90	144
JD 2444470.5	0	0	1211	930	723	579	477	401	343	297	259	226	198	173	151	132	116	105	100	109	146
1980 AUG 19.0	0	0	818	604	448	340	265	211	173	145	125	111	103	98	95	94	94	94	94	94	131
JD 2444460.5	1437	1363	1063	823	652	532	445	380	329	287	252	222	196	172	151	132	117	106	101	112	115
1980 AUG 9.0	1006	922	695	514	386	297	234	188	155	132	116	106	100	98	97	98	99	100	101	101	106
JD 2444450.5	0	1208	939	738	597	495	420	363	317	279	247	219	194	172	152	134	118	107	102	108	115
1980 JUL 30.0	0	795	592	442	336	261	208	169	141	122	110	104	101	101	102	104	107	109	112	109	112
JD 2444440.5	1359	1071	838	671	552	466	400	349	308	273	244	218	194	173	154	136	121	112	156	110	117
1980 JUL 20.0	899	683	509	384	295	232	186	153	130	116	107	104	104	106	110	113	117	122	159	120	122

(FLT T)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M18 E09

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)
JD 2444560.5	0	0	0	0	0	0	0	0	0	0	181	172	163	155	151	153	164	190	231	286	345
1980 NOV 17.0	0	0	0	0	0	0	0	0	0	0	1494	1530	1571	1611	1648	1678	1696	1697	1674	1624	1554
JD 2444550.5	0	0	0	0	0	0	0	0	0	196	189	179	170	163	160	164	178	208	253	311	370
1980 NOV 7.0	0	0	0	0	0	0	0	0	0	1428	1462	1503	1545	1586	1622	1650	1664	1658	1628	1570	1497
JD 2444540.5	0	0	0	0	0	0	0	0	209	203	194	184	175	168	166	172	190	222	272	332	392
1980 OCT 28.0	0	0	0	0	0	0	0	0	1362	1393	1434	1478	1522	1563	1598	1622	1632	1621	1583	1519	1447
JD 2444530.5	0	0	0	0	0	0	0	219	216	208	198	188	179	172	171	179	198	234	286	348	412
1980 OCT 18.0	0	0	0	0	0	0	0	1299	1325	1364	1409	1455	1500	1541	1575	1597	1602	1585	1541	1473	1404
JD 2444520.5	0	0	0	0	0	0	227	225	219	210	200	190	180	174	174	182	204	241	296	360	433
1980 OCT 8.0	0	0	0	0	0	0	1240	1258	1294	1338	1387	1435	1481	1521	1553	1573	1575	1553	1503	1433	1369
JD 2444510.5	0	0	0	0	0	232	232	228	221	211	201	190	181	175	175	184	206	245	301	370	458
1980 SEP 28.0	0	0	0	0	0	1185	1193	1224	1268	1317	1367	1417	1463	1503	1533	1551	1549	1523	1470	1400	1344
JD 2444500.5	0	0	0	0	234	237	234	229	221	211	200	189	180	173	173	182	204	243	301	377	496
1980 SEP 18.0	0	0	0	0	1136	1132	1156	1196	1245	1298	1350	1401	1447	1486	1516	1531	1527	1497	1441	1373	1331
JD 2444490.5	0	0	0	235	239	238	234	228	220	209	198	187	177	170	169	177	198	237	295	382	571
1980 SEP 8.0	0	0	0	1091	1076	1091	1126	1173	1226	1281	1335	1386	1432	1472	1500	1514	1508	1476	1419	1354	1348
JD 2444480.5	0	0	235	239	239	237	233	227	218	207	195	184	173	165	163	169	187	224	283	386	796
1980 AUG 29.0	0	0	1050	1025	1029	1057	1101	1154	1210	1266	1322	1373	1420	1459	1487	1500	1492	1458	1401	1342	1744
JD 2444470.5	0	0	238	239	238	236	231	224	215	204	192	179	168	158	154	157	172	203	258	392	-197
1980 AUG 19.0	0	0	980	972	991	1030	1081	1137	1195	1254	1310	1362	1409	1448	1476	1488	1479	1444	1386	1339	1115
JD 2444460.5	-21	236	236	236	235	233	228	221	212	200	187	174	161	150	142	141	150	171	212	425	145
1980 AUG 9.0	1849	938	920	929	961	1008	1063	1123	1183	1243	1300	1353	1400	1439	1467	1478	1469	1433	1372	1355	1195
JD 2444450.5	0	233	233	233	232	230	225	218	208	196	182	168	153	140	129	122	120	121	102	335	234
1980 JUL 30.0	0	874	871	895	936	989	1049	1111	1173	1234	1292	1345	1393	1432	1460	1471	1461	1421	1347	1332	1223
JD 2444440.5	229	278	228	229	229	226	222	214	204	191	177	161	144	128	112	96	78	37	-331	352	271
1980 JUL 20.0	831	820	832	867	916	974	1036	1100	1164	1226	1285	1339	1387	1427	1454	1465	1453	1404	1223	1357	1247

(FLT T)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

M18
E09

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

	(FLT T)(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)
JD 2444560.5	0	0	0	0	0	0	0	0	0	0	-119	-118	-121	-127	-135	-146	-159	-174	-192	-214	-241
1980 NOV 17.0	0	0	0	0	0	0	0	0	0	0	2278	2284	2300	2320	2341	2363	2382	2398	2409	2415	2415
JD 2444550.5	0	0	0	0	0	0	0	0	0	-107	-103	-104	-108	-115	-125	-137	-151	-167	-187	-212	-244
1980 NOV 7.0	0	0	0	0	0	0	0	0	0	2228	2232	2248	2269	2294	2320	2345	2367	2385	2396	2402	2399
JD 2444540.5	0	0	0	0	0	0	0	0	-97	-90	-88	-91	-97	-105	-115	-128	-143	-161	-183	-211	-250
1980 OCT 28.0	0	0	0	0	0	0	0	0	2182	2181	2195	2218	2245	2276	2306	2335	2360	2380	2393	2397	2392
JD 2444530.5	0	0	0	0	0	0	0	-88	-77	-73	-74	-79	-86	-95	-107	-121	-137	-156	-181	-213	-260
1980 OCT 18.0	0	0	0	0	0	0	0	2139	2131	2142	2165	2194	2229	2265	2301	2334	2363	2385	2398	2402	2393
JD 2444520.5	0	0	0	0	0	0	-82	-66	-59	-58	-61	-68	-76	-87	-100	-114	-132	-152	-179	-216	-276
1980 OCT 8.0	0	0	0	0	0	0	2101	2084	2090	2111	2141	2178	2220	2262	2305	2343	2376	2400	2415	2417	2404
JD 2444510.5	0	0	0	0	0	-78	-57	-46	-43	-45	-50	-58	-69	-81	-95	-110	-128	-149	-178	-221	-301
1980 SEP 28.0	0	0	0	0	0	2069	2041	2040	2057	2087	2125	2170	2219	2269	2318	2362	2399	2427	2442	2443	2424
JD 2444500.5	0	0	0	0	-78	-50	-35	-29	-29	-34	-41	-51	-63	-77	-91	-107	-125	-147	-177	-228	-342
1980 SEP 18.0	0	0	0	0	2045	2002	1992	2004	2031	2069	2116	2170	2228	2286	2342	2392	2433	2463	2479	2479	2453
JD 2444490.5	0	0	0	-79	-46	-26	-16	-14	-18	-25	-34	-47	-61	-75	-90	-106	-123	-144	-175	-234	-426
1980 SEP 8.0	0	0	0	2028	1970	1948	1952	1975	2012	2059	2116	2179	2246	2313	2376	2430	2474	2506	2523	2523	2484
JD 2444480.5	0	0	-83	-44	-18	-5	-0	-2	-8	-18	-31	-45	-61	-76	-91	-105	-121	-139	-169	-241	-694
1980 AUG 29.0	0	0	2017	1945	1909	1904	1920	1953	2000	2057	2125	2198	2275	2349	2417	2475	2520	2553	2571	2571	2428
JD 2444470.5	0	0	-45	-13	4	12	12	7	-1	-14	-30	-47	-64	-79	-93	-105	-117	-132	-158	-249	166
1980 AUG 19.0	0	0	1928	1877	1860	1868	1895	1939	1995	2064	2143	2227	2312	2391	2462	2521	2566	2598	2616	2617	2625
JD 2444460.5	-49	-47	-11	12	23	26	23	15	2	-14	-33	-52	-69	-84	-96	-105	-113	-121	-136	-277	-72
1980 AUG 9.0	1915	1918	1853	1821	1819	1839	1877	1931	1999	2080	2170	2263	2354	2437	2507	2564	2607	2637	2655	2657	2655
JD 2444450.5	0	-11	17	33	40	38	31	19	2	-17	-39	-59	-77	-89	-98	-103	-105	-102	-83	-214	-143
1980 JUL 30.0	0	1836	1789	1774	1785	1817	1866	1931	2012	2105	2205	2306	2399	2480	2547	2600	2640	2668	2685	2692	2686
JD 2444440.5	-13	20	41	51	53	48	37	20	-0	-24	-48	-69	-84	-95	-100	-100	-93	-69	148	-231	-175
1980 JUL 20.0	1826	1765	1736	1736	1759	1801	1862	1940	2034	2138	2246	2349	2441	2518	2580	2628	2664	2689	2687	2715	2710
	(FLT T)(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

M18
E09

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)
JD 2444560.5 1980 NOV 17.0	0	0	0	0	0	0	0	0	0	0	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169
JD 2444550.5 1980 NOV 7.0	0	0	0	0	0	0	0	0	0	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142
JD 2444540.5 1980 OCT 28.0	0	0	0	0	0	0	0	0	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113
JD 2444530.5 1980 OCT 18.0	0	0	0	0	0	0	0	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081
JD 2444520.5 1980 OCT 8.0	0	0	0	0	0	0	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046
JD 2444510.5 1980 SEP 28.0	0	0	0	0	0	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008
JD 2444500.5 1980 SEP 18.0	0	0	0	0	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966
JD 2444490.5 1980 SEP 8.0	0	0	0	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921
JD 2444480.5 1980 AUG 29.0	0	0	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873
JD 2444470.5 1980 AUG 19.0	0	0	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820
JD 2444460.5 1980 AUG 9.0	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764
JD 2444450.5 1980 JUL 30.0	0	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703
JD 2444440.5 1980 JUL 20.0	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639

(FLT T)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E09

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)
JD 2444560.5	0	0	0	0	0	0	0	0	0	0	212	212	212	212	212	212	212	212	212	212	212
1980 NOV 17.0	0	0	0	0	0	0	0	0	0	0	314	314	314	314	314	314	314	314	314	314	314
JD 2444550.5	0	0	0	0	0	0	0	0	0	228	228	228	228	228	228	228	228	228	228	228	228
1980 NOV 7.0	0	0	0	0	0	0	0	0	0	340	340	340	340	340	340	340	340	340	340	340	340
JD 2444540.5	0	0	0	0	0	0	0	0	243	243	243	243	243	243	243	243	243	243	243	243	243
1980 OCT 28.0	0	0	0	0	0	0	0	0	366	366	366	366	366	366	366	366	366	366	366	366	366
JD 2444530.5	0	0	0	0	0	0	0	257	257	257	257	257	257	257	257	257	257	257	257	257	257
1980 OCT 18.0	0	0	0	0	0	0	0	394	394	394	394	394	394	394	394	394	394	394	394	394	394
JD 2444520.5	0	0	0	0	0	0	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272
1980 OCT 8.0	0	0	0	0	0	0	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421
JD 2444510.5	0	0	0	0	0	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286
1980 SEP 28.0	0	0	0	0	0	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450
JD 2444500.5	0	0	0	0	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
1980 SEP 18.0	0	0	0	0	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479
JD 2444490.5	0	0	0	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313
1980 SEP 8.0	0	0	0	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509
JD 2444480.5	0	0	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326
1980 AUG 29.0	0	0	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540
JD 2444470.5	0	0	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338
1980 AUG 19.0	0	0	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573
JD 2444460.5	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
1980 AUG 9.0	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606
JD 2444450.5	0	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359
1980 JUL 30.0	0	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641
JD 2444440.5	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368
1980 JUL 20.0	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678
(FLT T)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)

JD2444000.5
1979 MAY 7.0

JD2444040.5
1979 JUN 16.0

JD2444080.5
1979 JUL 26.0

JD2444120.5
1979 SEP 4.0

JD2444160.5
1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E09

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

	(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)
JD 2444560.5		0	0	0	0	0	0	0	0	0	0	3258	3162	3065	2968	2871	2772	2674	2574	2475	2374	2273
1980 NOV 17.0		0	0	0	0	0	0	0	0	0	0	-984	-866	-761	-664	-570	-477	-385	-291	-196	-99	-2
JD 2444550.5		0	0	0	0	0	0	0	0	0	3294	3199	3102	3006	2909	2811	2713	2614	2515	2415	2315	2214
1980 NOV 7.0		0	0	0	0	0	0	0	0	0	-1048	-923	-816	-719	-627	-536	-446	-355	-262	-167	-71	25
JD 2444540.5		0	0	0	0	0	0	0	0	3331	3236	3140	3044	2947	2850	2752	2654	2556	2456	2356	2256	2155
1980 OCT 28.0		0	0	0	0	0	0	0	0	-1117	-983	-873	-775	-683	-595	-507	-418	-328	-236	-142	-47	50
JD 2444530.5		0	0	0	0	0	0	0	3369	3274	3178	3082	2986	2889	2792	2695	2597	2498	2399	2299	2198	2098
1980 OCT 18.0		0	0	0	0	0	0	0	-1192	-1046	-930	-830	-739	-652	-567	-481	-394	-306	-214	-121	-25	72
JD 2444520.5		0	0	0	0	0	0	3408	3312	3217	3121	3026	2929	2833	2736	2638	2540	2441	2342	2242	2142	2041
1980 OCT 8.0		0	0	0	0	0	0	-1276	-1114	-990	-886	-795	-709	-625	-543	-459	-374	-286	-196	-103	-7	91
JD 2444510.5		0	0	0	0	0	3447	3352	3257	3161	3066	2970	2874	2777	2680	2582	2484	2385	2286	2186	2086	1985
1980 SEP 28.0		0	0	0	0	0	-1371	-1188	-1052	-944	-850	-764	-683	-603	-522	-441	-357	-270	-180	-87	8	106
JD 2444500.5		0	0	0	0	3488	3393	3297	3202	3107	3011	2915	2819	2722	2625	2527	2429	2330	2231	2131	2031	1930
1980 SEP 18.0		0	0	0	0	-1477	-1270	-1119	-1003	-905	-819	-739	-661	-583	-505	-425	-343	-257	-168	-76	20	119
JD 2444490.5		0	0	0	3530	3434	3339	3243	3148	3053	2957	2861	2765	2668	2571	2473	2375	2277	2177	2077	1977	1876
1980 SEP 8.0		0	0	0	-1594	-1362	-1192	-1064	-962	-874	-793	-717	-642	-568	-491	-413	-332	-247	-159	-67	29	128
JD 2444480.5		0	0	3572	3477	3381	3286	3190	3095	3000	2904	2808	2712	2615	2518	2421	2322	2224	2124	2024	1924	1824
1980 AUG 29.0		0	0	-1719	-1466	-1273	-1131	-1020	-928	-847	-772	-699	-627	-555	-480	-404	-324	-241	-153	-61	34	134
JD 2444470.5		0	0	3521	3425	3329	3234	3138	3043	2948	2852	2756	2660	2563	2466	2368	2270	2172	2072	1972	1872	1771
1980 AUG 19.0		0	0	-1581	-1363	-1203	-1081	-984	-900	-825	-753	-684	-615	-544	-472	-397	-319	-237	-150	-58	37	138
JD 2444460.5		62	3566	3469	3374	3278	3183	3087	2992	2896	2801	2705	2609	2512	2415	2317	2219	2120	2021	1921	1821	1720
1980 AUG 9.0		1763	-1705	-1465	-1282	-1147	-1041	-954	-877	-806	-738	-672	-605	-536	-466	-393	-316	-235	-150	-59	36	137
JD 2444450.5		0	3515	3419	3323	3228	3132	3037	2942	2846	2750	2655	2558	2462	2365	2267	2169	2070	1971	1871	1770	1670
1980 JUL 30.0		0	-1579	-1372	-1218	-1101	-1008	-929	-857	-790	-726	-662	-597	-531	-463	-391	-316	-236	-152	-62	32	133
JD 2444440.5		3562	3466	3370	3274	3178	3083	2987	2892	2797	2701	2605	2509	2412	2315	2217	2119	2020	1921	1821	1721	1620
1980 JUL 20.0		-1700	-1473	-1297	-1166	-1064	-981	-908	-841	-778	-716	-654	-592	-528	-461	-391	-318	-240	-157	-69	25	126
	(FLT T)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

M18
E09

EARTH -. MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

	(FLT T)(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)
JD 2444560.5	0	0	0	0	0	0	0	0	0	0	279	227	195	176	164	158	157	161	170	186	213
1980 NOV 17.0	0	0	0	0	0	0	0	0	0	0	502	419	360	318	287	264	247	235	227	223	222
JD 2444550.5	0	0	0	0	0	0	0	0	0	287	226	191	170	156	149	146	148	154	166	187	221
1980 NOV 7.0	0	0	0	0	0	0	0	0	0	550	453	385	336	301	274	255	240	230	224	220	220
JD 2444540.5	0	0	0	0	0	0	0	0	296	225	186	162	147	138	134	134	138	147	162	187	230
1980 OCT 28.0	0	0	0	0	0	0	0	0	605	493	415	359	318	287	264	247	235	226	221	218	219
JD 2444530.5	0	0	0	0	0	0	0	306	223	179	153	137	127	122	120	122	128	139	157	187	242
1980 OCT 18.0	0	0	0	0	0	0	0	669	541	450	385	338	303	276	256	241	230	223	218	217	218
JD 2444520.5	0	0	0	0	0	0	321	219	170	142	125	115	108	106	106	110	117	130	151	188	259
1980 OCT 8.0	0	0	0	0	0	0	741	596	491	416	361	321	291	268	250	236	227	220	216	216	218
JD 2444510.5	0	0	0	0	0	343	215	160	130	112	101	95	91	90	92	97	106	120	145	189	284
1980 SEP 28.0	0	0	0	0	0	818	660	539	452	389	343	308	281	261	245	233	224	218	215	215	217
JD 2444500.5	0	0	0	0	383	210	148	116	98	87	80	76	74	75	78	84	93	109	136	190	330
1980 SEP 18.0	0	0	0	0	893	732	595	494	421	368	328	297	274	255	241	230	222	217	215	215	218
JD 2444490.5	0	0	0	475	204	132	100	82	71	65	61	59	58	60	63	69	79	95	125	191	438
1980 SEP 8.0	0	0	0	955	808	659	543	458	397	351	316	289	268	251	238	229	221	217	215	215	218
JD 2444480.5	0	0	868	195	112	80	64	54	48	44	42	42	42	44	47	53	62	78	109	194	1019
1980 AUG 29.0	0	0	993	884	730	599	502	430	377	337	306	282	263	249	237	228	221	217	215	216	219
JD 2444470.5	0	0	182	84	55	42	35	30	28	26	25	25	26	27	30	34	42	55	85	201	498
1980 AUG 19.0	0	0	949	807	663	551	468	407	361	326	299	278	260	247	236	228	222	218	217	217	221
JD 2444460.5	80	145	38	23	16	13	11	10	9	9	9	9	9	10	11	13	16	23	41	239	62
1980 AUG 9.0	999	990	882	735	608	512	442	389	349	318	294	274	259	247	237	229	224	220	219	220	223
JD 2444450.5	0	51	24	16	12	10	9	8	8	8	8	8	8	9	10	13	17	26	61	147	34
1980 JUL 30.0	0	947	810	672	563	481	420	374	339	311	290	272	258	247	239	232	227	223	222	223	226
JD 2444440.5	357	101	60	44	35	30	27	25	24	24	24	25	27	30	35	44	63	112	632	171	76
1980 JUL 20.0	989	885	744	620	526	455	403	362	331	307	287	272	259	249	241	235	231	228	226	227	230
	(FLT T)(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)

JD2444000.5
1979 MAY 7.0

JD2444040.5
1979 JUN 16.0

JD2444080.5
1979 JUL 26.0

JD2444120.5
1979 SEP 4.0

JD2444160.5
1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E09

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

	(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)
JD 2444560.5		0	0	0	0	0	0	0	0	0	0	624	730	805	860	901	932	954	971	981	987	988
1980 NOV 17.0		0	0	0	0	0	0	0	0	0	0	1883	1781	1711	1661	1626	1600	1581	1568	1559	1554	1551
JD 2444550.5		0	0	0	0	0	0	0	0	0	562	684	770	833	880	915	942	962	976	984	988	-986
1980 NOV 7.0		0	0	0	0	0	0	0	0	0	1934	1816	1735	1678	1637	1607	1585	1570	1559	1551	1547	1545
JD 2444540.5		0	0	0	0	0	0	0	0	491	630	730	802	855	895	926	950	967	979	987	989	-986
1980 OCT 28.0		0	0	0	0	0	0	0	0	1994	1858	1764	1698	1651	1617	1592	1573	1560	1551	1545	1541	1540
JD 2444530.5		0	0	0	0	0	0	0	409	569	683	765	826	872	908	935	956	971	982	988	989	-985
1980 OCT 18.0		0	0	0	0	0	0	0	2066	1908	1799	1723	1669	1629	1601	1579	1564	1552	1545	1539	1537	1536
JD 2444520.5		0	0	0	0	0	0	319	498	629	723	793	845	886	917	942	961	975	984	989	990	-984
1980 OCT 8.0		0	0	0	0	0	0	2146	1968	1841	1753	1690	1645	1612	1588	1569	1556	1546	1540	1536	1534	1533
JD 2444510.5		0	0	0	0	0	224	417	566	675	755	815	861	897	925	947	965	977	986	990	-989	-984
1980 SEP 28.0		0	0	0	0	0	2233	2038	1891	1788	1716	1664	1626	1598	1577	1562	1550	1542	1537	1533	1531	1532
JD 2444500.5		0	0	0	0	131	328	495	620	711	780	832	873	905	931	952	968	979	987	991	-989	-983
1980 SEP 18.0		0	0	0	0	2319	2116	1950	1831	1747	1687	1643	1611	1587	1569	1556	1547	1540	1535	1532	1531	1531
JD 2444490.5		0	0	0	55	233	415	557	662	740	799	846	882	912	936	955	970	981	988	991	-988	-982
1980 SEP 8.0		0	0	0	2392	2202	2018	1881	1783	1713	1663	1626	1599	1579	1564	1553	1545	1539	1535	1533	1532	1532
JD 2444480.5		0	0	8	141	327	486	606	695	763	815	857	890	917	939	957	971	982	988	991	-988	-982
1980 AUG 29.0		0	0	2438	2287	2096	1939	1825	1744	1686	1644	1613	1590	1573	1561	1552	1545	1540	1537	1535	1534	1535
JD 2444470.5		0	0	62	233	406	542	645	722	781	828	865	896	921	942	959	972	982	989	991	-988	-981
1980 AUG 19.0		0	0	2361	2179	2006	1874	1780	1713	1665	1629	1603	1584	1570	1560	1552	1547	1543	1541	1540	1539	1539
JD 2444460.5		-1	12	142	318	471	588	676	743	795	838	872	900	924	943	960	973	982	989	991	-988	-981
1980 AUG 9.0		2653	2410	2263	2081	1932	1823	1744	1688	1648	1618	1596	1581	1569	1561	1555	1552	1549	1548	1547	1546	1547
JD 2444450.5		0	63	226	391	524	624	700	760	807	[illegible]	877	903	926	944	960	972	982	988	991	-988	-982
1980 JUL 30.0		0	2336	2162	1998	1871	1780	1715	1668	1634	1610	1592	1579	1571	1565	1561	1559	1558	1557	1557	1557	1557
JD 2444440.5		13	137	305	452	566	653	720	773	816	851	880	905	926	944	959	972	981	988	991	-988	-982
1980 JUL 20.0		2384	2243	2071	1928	1822	1746	1692	1653	1625	1605	1591	1581	1575	1571	1570	1569	-1568	-1569	-1570	-1570	-1570
	(FLT T)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)

JD2444000.5 1979 MAY 7.0

JD2444040.5 1979 JUN 16.0

JD2444080.5 1979 JUL 26.0

JD2444120.5 1979 SEP 4.0

JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E09

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)
JD 2444560.5	0	0	0	0	0	0	0	0	0	0	341	315	297	283	270	259	249	239	229	219	210
1980 NOV 17.0	0	0	0	0	0	0	0	0	0	0	366	357	347	338	329	319	310	300	290	281	271
JD 2444550.5	0	0	0	0	0	0	0	0	0	358	326	305	289	276	264	253	243	233	223	214	205
1980 NOV 7.0	0	0	0	0	0	0	0	0	0	368	359	350	340	331	322	312	302	293	283	274	264
JD 2444540.5	0	0	0	0	0	0	0	0	381	338	314	296	282	269	258	247	237	227	218	209	199
1980 OCT 28.0	0	0	0	0	0	0	0	0	370	361	352	343	333	324	314	305	295	286	276	267	257
JD 2444530.5	0	0	0	0	0	0	0	414	355	324	304	288	275	263	252	242	232	222	213	203	194
1980 OCT 18.0	0	0	0	0	0	0	0	372	363	354	345	336	326	317	307	298	288	279	269	260	250
JD 2444520.5	0	0	0	0	0	0	464	377	337	313	295	281	269	257	247	236	226	217	207	198	189
1980 OCT 8.0	0	0	0	0	0	0	373	365	357	348	338	329	319	310	300	291	281	272	262	253	243
JD 2444510.5	0	0	0	0	0	548	409	354	324	304	288	275	263	252	241	231	221	212	202	193	184
1980 SEP 28.0	0	0	0	0	0	375	367	359	350	341	331	322	312	303	293	284	274	264	255	245	236
JD 2444500.5	0	0	0	0	710	457	376	338	313	296	281	269	257	246	236	226	216	207	197	188	179
1980 SEP 18.0	0	0	0	0	376	369	361	352	343	334	324	315	305	296	286	277	267	257	248	238	229
JD 2444490.5	0	0	0	1096	537	408	355	325	305	289	275	263	252	241	231	221	211	201	192	183	174
1980 SEP 8.0	0	0	0	377	371	363	355	346	336	327	318	308	298	289	279	270	260	250	241	231	222
JD 2444480.5	0	0	2792	686	456	378	339	315	297	282	269	258	246	236	226	216	206	196	187	178	169
1980 AUG 29.0	0	0	377	372	365	357	348	339	330	320	311	301	291	282	272	263	253	243	234	224	215
JD 2444470.5	0	0	1029	535	411	358	327	306	290	276	264	252	241	231	221	211	201	192	182	173	164
1980 AUG 19.0	0	0	373	367	359	350	341	332	323	313	304	294	285	275	265	256	246	236	227	217	208
JD 2444460.5	107	2364	682	461	382	343	317	299	284	270	258	247	236	226	216	206	196	187	177	168	159
1980 AUG 9.0	216	373	368	361	353	344	335	326	316	307	297	287	278	268	258	249	239	230	220	210	201
JD 2444450.5	0	1015	542	417	362	331	309	292	278	265	253	242	231	221	211	201	191	182	172	163	154
1980 JUL 30.0	0	369	363	355	347	338	328	319	309	300	290	280	271	261	251	242	232	223	213	203	194
JD 2444440.5	2261	693	469	388	347	321	302	286	272	260	248	237	227	216	206	196	187	177	168	158	149
1980 JUL 20.0	369	364	357	349	340	331	322	312	303	293	283	274	264	254	245	235	225	216	206	197	187

(FLT T)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M18 E09

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)
JD 2444560.5 1980 NOV 17.0	0	0	0	0	0	0	0	0	0	0	772	772	772	772	772	772	772	772	772	772	772
JD 2444550.5 1980 NOV 7.0	0	0	0	0	0	0	0	0	0	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444540.5 1980 OCT 28.0	0	0	0	0	0	0	0	0	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444530.5 1980 OCT 18.0	0	0	0	0	0	0	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444520.5 1980 OCT 8.0	0	0	0	0	0	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444510.5 1980 SEP 28.0	0	0	0	0	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444500.5 1980 SEP 18.0	0	0	0	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444490.5 1980 SEP 8.0	0	0	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444480.5 1980 AUG 29.0	0	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444470.5 1980 AUG 19.0	0	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444460.5 1980 AUG 9.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444450.5 1980 JUL 30.0	0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444440.5 1980 JUL 20.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772

(FLT T)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)

JD2444000.5 1979 MAY 7.0 JD2444040.5 1979 JUN 16.0 JD2444080.5 1979 JUL 26.0 JD2444120.5 1979 SEP 4.0 JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

M18
E09

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

	(FLT T)(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)
JD 2444560.5	0	0	0	0	0	0	0	0	0	0	1088	845	687	580	506	453	416	390	374	366	366
1980 NOV 17.0	0	0	0	0	0	0	0	0	0	0	885	677	541	451	389	346	316	296	283	276	275
JD 2444550.5	0	0	0	0	0	0	0	0	0	1238	945	757	631	543	481	436	404	383	370	364	367
1980 NOV 7.0	0	0	0	0	0	0	0	0	0	982	734	574	468	396	346	312	288	272	262	257	257
JD 2444540.5	0	0	0	0	0	0	0	0	1422	1067	841	691	588	515	462	423	396	377	366	363	368
1980 OCT 28.0	0	0	0	0	0	0	0	0	1106	809	619	493	409	351	311	284	265	252	245	241	242
JD 2444530.5	0	0	0	0	0	0	0	1647	1217	944	764	642	555	493	447	413	389	373	364	363	370
1980 OCT 18.0	0	0	0	0	0	0	0	1262	905	677	528	429	361	315	283	260	245	236	230	228	230
JD 2444520.5	0	0	0	0	0	0	1921	1398	1067	852	706	604	530	476	435	405	384	370	363	363	373
1980 OCT 8.0	0	0	0	0	0	0	1455	1026	753	575	457	377	323	285	260	242	230	223	218	217	220
JD 2444510.5	0	0	0	0	0	2247	1620	1218	957	783	662	575	510	462	426	399	380	367	362	364	376
1980 SEP 28.0	0	0	0	0	0	1688	1179	849	635	494	399	335	292	262	242	228	219	213	210	210	213
JD 2444500.5	0	0	0	0	2626	1889	1400	1084	874	730	627	552	495	452	419	395	377	365	361	364	381
1980 SEP 18.0	0	0	0	0	1960	1367	971	713	543	430	354	302	267	244	228	218	211	207	205	205	211
JD 2444490.5	0	0	0	3045	2210	1621	1236	983	811	689	601	534	484	445	414	391	375	364	360	365	394
1980 SEP 8.0	0	0	0	2260	1595	1122	811	606	470	378	317	276	248	230	219	212	208	205	204	204	216
JD 2444480.5	0	0	3479	2583	1888	1421	1113	906	762	658	580	521	475	439	411	389	374	364	360	365	500
1980 AUG 29.0	0	0	2568	1861	1309	935	687	522	412	337	288	256	235	222	214	210	208	206	206	206	304
JD 2444470.5	0	0	2998	2206	1643	1269	1019	847	724	633	564	511	469	436	409	389	373	364	360	367	403
1980 AUG 19.0	0	0	2156	1534	1088	788	588	455	365	305	266	241	226	218	214	212	212	212	212	212	277
JD 2444460.5	3645	3431	2576	1911	1457	1153	946	800	694	614	553	504	465	434	409	389	374	364	360	370	372
1980 AUG 9.0	2708	2463	1797	1275	915	672	510	400	327	280	250	232	223	218	218	219	220	222	224	223	233
JD 2444450.5	0	2988	2229	1683	1313	1063	889	764	671	600	544	500	463	434	409	390	375	365	361	366	372
1980 JUL 30.0	0	2090	1500	1071	778	580	446	357	298	261	239	228	223	223	226	229	234	238	243	238	243
JD 2444440.5	3420	2598	1953	1505	1202	993	845	736	654	590	539	498	464	435	412	393	378	369	415	368	374
1980 JUL 20.0	2394	1762	1261	908	668	505	395	323	276	249	234	229	229	233	238	245	252	261	335	258	261

	(FLT T)(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E09

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

	(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)
JD 2444560.5		0	0	0	0	0	0	0	0	0	0	1972	1522	1228	1031	894	799	732	686	657	642	641
1980 NOV 17.0		0	0	0	0	0	0	0	0	0	0	3258	3162	3065	2968	2871	2772	2674	2574	2475	2374	2273
JD 2444550.5		0	0	0	0	0	0	0	0	0	2220	1679	1331	1099	939	827	748	692	655	632	622	624
1980 NOV 7.0		0	0	0	0	0	0	0	0	0	3294	3199	3102	3006	2909	2811	2713	2614	2515	2415	2315	2214
JD 2444540.5		0	0	0	0	0	0	0	0	2528	1876	1460	1185	997	866	773	707	660	629	611	605	611
1980 OCT 28.0		0	0	0	0	0	0	0	0	3331	3236	3140	3044	2947	2850	2752	2654	2556	2456	2356	2256	2155
JD 2444530.5		0	0	0	0	0	0	0	2909	2121	1621	1293	1071	916	807	729	673	634	608	594	591	600
1980 OCT 18.0		0	0	0	0	0	0	0	3369	3274	3178	3082	2986	2889	2792	2695	2597	2498	2399	2299	2198	2098
JD 2444520.5		0	0	0	0	0	0	3375	2425	1820	1427	1163	981	853	761	695	647	614	592	581	580	593
1980 OCT 8.0		0	0	0	0	0	0	3408	3312	3217	3121	3026	2929	2833	2736	2638	2540	2441	2342	2242	2142	2041
JD 2444510.5		0	0	0	0	0	3935	2799	2067	1592	1277	1061	910	802	724	668	627	599	580	572	573	590
1980 SEP 28.0		0	0	0	0	0	3447	3352	3257	3161	3066	2970	2874	2777	2680	2582	2484	2385	2286	2186	2086	1985
JD 2444500.5		0	0	0	0	4586	3256	2371	1797	1417	1160	981	854	762	696	647	612	588	573	566	569	592
1980 SEP 18.0		0	0	0	0	3488	3393	3297	3202	3107	3011	2915	2819	2722	2625	2527	2429	2330	2231	2131	2031	1930
JD 2444490.5		0	0	0	5305	3804	2744	2048	1590	1281	1068	918	810	732	675	634	603	582	569	564	568	609
1980 SEP 8.0		0	0	0	3530	3434	3339	3243	3148	3053	2957	2861	2765	2668	2571	2473	2375	2277	2177	2077	1977	1876
JD 2444480.5		0	0	6047	4443	3197	2355	1800	1428	1173	995	868	777	710	661	625	599	581	570	566	571	803
1980 AUG 29.0		0	0	3572	3477	3381	3286	3190	3095	3000	2904	2808	2712	2615	2518	2421	2322	2224	2124	2024	1924	1824
JD 2444470.5		0	0	5154	3741	2731	2058	1608	1301	1088	938	830	752	696	654	623	601	585	576	572	579	680
1980 AUG 19.0		0	0	3521	3425	3329	3234	3138	3043	2948	2852	2756	2660	2563	2466	2368	2270	2172	2072	1972	1872	1771
JD 2444460.5		6353	5894	4373	3186	2372	1826	1456	1201	1021	894	803	736	688	652	626	607	594	586	584	593	605
1980 AUG 9.0		62	3566	3469	3374	3278	3183	3087	2992	2896	2801	2705	2609	2512	2415	2317	2219	2120	2021	1921	1821	1720
JD 2444450.5		0	5078	3730	2753	2091	1643	1336	1121	970	861	784	728	687	657	635	619	609	603	605	604	615
1980 JUL 30.0		0	3515	3419	3323	3228	3132	3037	2942	2846	2750	2655	2558	2462	2365	2267	2169	2070	1971	1871	1770	1670
JD 2444440.5		5814	4361	3213	2413	1870	1498	1240	1059	930	839	773	726	692	668	650	638	630	630	749	626	635
1980 JUL 20.0		3562	3466	3370	3274	3178	3083	2987	2892	2797	2701	2605	2509	2412	2315	2217	2119	2020	1921	1821	1721	1620
	(FLT T)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

M18
E10

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444380.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671741	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.603	DEGREES
MEAN ANOM. AT EPOCH	=	136.192	DEGREES
DATE OF NODAL PASSAGE	=	2444505.376	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444380.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338734	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.406	DEGREES
ARG. OF PERIHELION	=	286.292	DEGREES
MEAN ANOM. AT EPOCH	=	225.039	DEGREES
DATE OF NODAL PASSAGE	=	2444072.521	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.063	DEGREES

M18
E10

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)
JD 2444560.5	108	118	138	174	296	482	258	272	304	342	385	431	481	534	590	651	715	783	855	931	1011
1980 NOV 17.0	130	132	137	152	227	385	201	198	211	230	253	280	310	344	381	423	467	516	569	627	689
JD 2444550.5	109	122	148	205	1125	262	251	279	316	357	402	450	502	557	616	679	746	817	892	972	1057
1980 NOV 7.0	120	123	131	160	844	205	181	189	205	226	251	279	311	347	386	429	476	528	584	645	712
JD 2444540.5	111	128	162	314	325	233	255	289	328	371	418	469	523	580	642	708	778	852	931	1015	1105
1980 OCT 28.0	112	116	129	225	257	169	169	182	200	222	249	278	312	349	391	436	486	541	601	666	738
JD 2444530.5	113	134	192	1060	223	231	262	299	341	386	435	487	544	604	669	738	811	889	973	1062	1158
1980 OCT 18.0	105	110	137	811	165	153	161	176	196	219	247	276	313	352	396	444	497	555	619	690	768
JD 2444520.5	116	145	320	241	209	235	270	309	353	400	451	506	566	629	697	769	846	928	1017	1112	1216
1980 OCT 8.0	99	108	219	187	140	143	154	171	191	216	245	278	315	356	402	453	509	571	640	717	804
JD 2444510.5	120	168	512	190	208	240	278	320	365	415	468	526	588	654	725	801	883	970	1065	1167	0
1980 SEP 28.0	95	114	396	134	128	135	149	166	188	213	243	278	317	360	409	463	523	591	666	750	0
JD 2444500.5	125	295	184	183	212	247	286	330	377	429	485	545	610	680	755	835	921	1015	1117	1229	1393
1980 SEP 18.0	93	196	141	117	120	130	144	162	184	211	242	278	319	366	417	475	540	613	696	791	1079
JD 2444490.5	137	273	160	184	216	253	294	339	389	443	502	565	633	707	786	871	963	1064	1175	1433	1492
1980 SEP 8.0	96	218	112	110	116	126	140	159	182	209	242	280	323	372	427	490	561	641	734	1100	1220
JD 2444480.5	219	142	157	186	220	259	302	349	401	457	519	585	657	735	819	910	1009	1119	1242	1525	1653
1980 AUG 29.0	144	113	105	107	113	123	138	156	180	209	243	282	328	380	440	508	586	676	781	1235	1423
JD 2444470.5	146	134	158	188	224	264	309	358	412	472	536	606	682	764	854	952	1061	1182	1559	1679	1888
1980 AUG 19.0	131	104	104	107	113	123	137	155	179	209	244	286	335	391	456	530	617	719	1251	1433	1700
JD 2444460.5	115	134	159	191	228	269	316	367	424	486	554	628	708	796	893	1000	1119	1256	1708	1912	2228
1980 AUG 9.0	106	106	108	111	116	125	138	156	180	211	248	292	344	405	476	559	657	776	1445	1709	2078
JD 2444450.5	115	134	161	193	231	274	322	376	436	501	572	651	737	831	936	1054	1188	1738	1936	2249	0
1980 JUL 30.0	112	113	115	117	121	129	141	159	183	214	253	300	356	423	501	596	709	1457	1717	2086	0
JD 2444440.5	117	135	162	195	234	278	329	385	447	516	592	675	768	870	985	1117	1272	1960	2270	0	0
1980 JUL 20.0	122	124	125	127	130	136	148	165	189	221	261	312	373	446	535	644	779	1727	2094	0	0

(FLT T)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M18 E10

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

	(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)
JD 2444560.5		345	398	449	529	736	-445	-115	-4	31	38	32	19	1	-19	-40	-62	-84	-106	-126	-146	-163
1980 NOV 17.0		1554	1487	1450	1466	1669	979	1301	1396	1467	1532	1596	1658	1719	1779	1839	1899	1957	2015	2073	2130	2187
JD 2444550.5		370	425	491	626	627	-200	-17	40	57	56	46	31	12	-9	-31	-53	-75	-97	-117	-137	-155
1980 NOV 7.0		1498	1437	1415	1480	3412	1204	1321	1394	1459	1522	1584	1645	1705	1765	1824	1882	1940	1997	2053	2108	2163
JD 2444540.5		392	454	550	805	-360	-51	41	72	78	72	59	42	22	0	-21	-44	-66	-88	-108	-127	-145
1980 OCT 28.0		1447	1396	1398	1744	1062	1248	1324	1388	1450	1511	1572	1632	1692	1751	1809	1866	1922	1978	2032	2086	2138
JD 2444530.5		412	490	651	-498	-121	31	80	95	94	85	70	52	31	9	-12	-35	-57	-78	-99	-118	-135
1980 OCT 18.0		1404	1365	1421	483	1174	1258	1320	1380	1440	1500	1560	1620	1679	1737	1794	1850	1905	1958	2011	2063	2113
JD 2444520.5		433	544	842	-262	5	83	109	114	108	96	80	61	40	18	-3	-25	-47	-69	-89	-108	-125
1980 OCT 8.0		1369	1350	2017	1086	1198	1257	1313	1371	1430	1489	1548	1607	1665	1722	1778	1833	1887	1939	1990	2039	2086
JD 2444510.5		458	642	-535	-47	77	117	130	129	120	106	89	70	49	27	5	-16	-38	-59	-78	-97	0
1980 SEP 28.0		1344	1375	806	1145	1202	1253	1306	1362	1420	1478	1537	1595	1652	1708	1763	1816	1868	1919	1967	2014	0
JD 2444500.5		496	840	-157	61	122	142	146	141	130	116	98	78	57	36	14	-7	-28	-48	-68	-85	203
1980 SEP 18.0		1332	2166	1096	1159	1200	1246	1298	1353	1410	1468	1525	1583	1639	1694	1747	1799	1849	1898	1945	1989	1230
JD 2444490.5		571	-431	30	122	152	161	160	152	139	124	106	86	66	44	23	2	-18	-38	-56	219	212
1980 SEP 8.0		1348	984	1131	1161	1196	1240	1290	1344	1400	1457	1514	1570	1625	1679	1731	1782	1830	1877	1921	1139	1179
JD 2444480.5		796	-29	120	160	174	175	170	161	147	131	113	94	73	53	32	11	-8	-27	-44	225	219
1980 AUG 29.0		1745	1122	1140	1160	1192	1234	1283	1336	1391	1447	1503	1558	1612	1665	1715	1764	1810	1855	1896	1086	1128
JD 2444470.5		-197	121	170	186	190	187	180	169	155	138	120	101	81	61	41	21	2	-15	233	229	225
1980 AUG 19.0		1115	1147	1144	1159	1189	1229	1277	1329	1383	1438	1493	1546	1599	1650	1699	1746	1790	1832	990	1033	1079
JD 2444460.5		145	189	202	205	203	197	187	176	161	145	127	108	89	69	50	31	13	-3	234	232	229
1980 AUG 9.0		1195	1160	1148	1159	1187	1225	1272	1322	1375	1429	1482	1535	1586	1635	1682	1727	1769	1808	936	981	1032
JD 2444450.5		234	227	223	219	213	205	194	182	167	151	133	115	96	77	59	41	24	233	234	234	0
1980 JUL 30.0		1223	1173	1155	1162	1186	1223	1268	1317	1368	1420	1472	1523	1573	1620	1665	1707	1747	838	882	932	0
JD 2444440.5		271	250	239	230	221	211	200	187	172	156	139	122	104	85	68	51	35	230	233	0	0
1980 JUL 20.0		1247	1189	1164	1167	1188	1223	1265	1312	1362	1412	1463	1512	1559	1605	1648	1687	1724	783	832	0	0
	(FLT T)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E10

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

	(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)
JD 2444560.5		-241	-277	-329	-425	-657	326	69	-41	-95	-128	-151	-168	-182	-193	-203	-212	-219	-226	-233	-238	-243
1980 NOV 17.0		2415	2408	2394	2364	2283	2608	2463	2428	2412	2404	2402	2404	2411	2421	2435	2453	2474	2498	2526	2557	2591
JD 2444550.5		-244	-288	-362	-521	-762	167	8	-62	-102	-129	-148	-164	-176	-187	-197	-206	-214	-222	-229	-235	-241
1980 NOV 7.0		2399	2388	2365	2307	2769	2476	2418	2393	2378	2370	2368	2370	2377	2388	2402	2420	2442	2468	2497	2530	2566
JD 2444540.5		-250	-308	-420	-704	298	70	-24	-74	-105	-128	-145	-159	-171	-181	-191	-201	-210	-218	-225	-232	-239
1980 OCT 28.0		2392	2375	2335	2179	2527	2423	2385	2363	2348	2340	2337	2339	2346	2357	2372	2391	2414	2441	2471	2506	2544
JD 2444530.5		-260	-341	-531	293	150	17	-44	-81	-106	-125	-140	-153	-165	-176	-186	-195	-205	-214	-222	-230	-237
1980 OCT 18.0		2393	2367	2289	2657	2447	2392	2360	2338	2323	2314	2310	2311	2318	2329	2345	2365	2389	2417	2449	2485	2526
JD 2444520.5		-276	-399	-738	261	65	-14	-58	-86	-106	-123	-136	-148	-159	-170	-180	-190	-200	-210	-219	-227	-235
1980 OCT 8.0		2404	2362	2115	2496	2416	2374	2343	2319	2302	2291	2286	2287	2293	2305	2321	2342	2367	2396	2430	2469	2512
JD 2444510.5		-301	-513	385	122	15	-36	-68	-89	-106	-120	-132	-144	-154	-165	-175	-186	-196	-206	-216	-225	0
1980 SEP 28.0		2424	2347	2585	2456	2404	2365	2332	2305	2286	2273	2266	2266	2272	2284	2300	2322	2348	2380	2415	2456	0
JD 2444500.5		-342	-753	200	42	-19	-53	-76	-93	-106	-118	-129	-139	-150	-160	-171	-182	-193	-204	-214	-224	-206
1980 SEP 18.0		2453	2160	2512	2452	2406	2365	2328	2297	2274	2259	2251	2249	2255	2266	2284	2306	2334	2367	2404	2447	3004
JD 2444490.5		-426	347	65	-10	-46	-69	-84	-97	-107	-117	-127	-136	-146	-157	-168	-179	-190	-202	-213	-218	-200
1980 SEP 8.0		2484	2578	2512	2465	2419	2374	2332	2296	2269	2250	2239	2237	2242	2253	2271	2294	2323	2357	2397	2942	3035
JD 2444480.5		-695	90	-13	-50	-70	-83	-93	-102	-109	-117	-125	-134	-144	-154	-165	-177	-188	-200	-212	-213	-197
1980 AUG 29.0		2428	2574	2535	2490	2441	2390	2342	2301	2268	2246	2233	2228	2232	2243	2261	2286	2316	2352	2394	2974	3053
JD 2444470.5		166	-31	-66	-82	-91	-98	-103	-108	-113	-119	-125	-133	-142	-152	-164	-175	-188	-200	-223	-210	-196
1980 AUG 19.0		2625	2601	2568	2523	2471	2414	2360	2312	2274	2247	2231	2224	2227	2238	2256	2281	2313	2350	2915	2995	3060
JD 2444460.5		-72	-96	-104	-108	-111	-113	-114	-116	-118	-122	-127	-134	-142	-152	-163	-175	-188	-200	-220	-208	-197
1980 AUG 9.0		2655	2636	2604	2559	2505	2444	2384	2330	2286	2254	2234	2225	2226	2237	2255	2281	2313	2352	2937	3004	3059
JD 2444450.5		-143	-135	-132	-130	-129	-128	-126	-125	-124	-126	-130	-136	-143	-153	-164	-176	-189	-229	-219	-209	0
1980 JUL 30.0		2686	2668	2638	2595	2540	2478	2413	2353	2303	2266	2242	2230	2229	2239	2257	2283	2317	2879	2949	3005	0
JD 2444440.5		-175	-160	-153	-149	-145	-142	-138	-135	-132	-132	-134	-139	-146	-155	-166	-178	-190	-227	-219	0	0
1980 JUL 20.0		2710	2694	2667	2627	2574	2512	2445	2381	2325	2282	2254	2239	2237	2245	2263	2290	2324	2893	2951	0	0
	(FLT T)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M18 E10

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

	(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)
JD 2444560.5 1980 NOV 17.0		2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169
JD 2444550.5 1980 NOV 7.0		2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142
JD 2444540.5 1980 OCT 28.0		2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113
JD 2444530.5 1980 OCT 18.0		2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081
JD 2444520.5 1980 OCT 8.0		2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046
JD 2444510.5 1980 SEP 28.0		2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	0
JD 2444500.5 1980 SEP 18.0		1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966
JD 2444490.5 1980 SEP 8.0		1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921
JD 2444480.5 1980 AUG 29.0		1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873
JD 2444470.5 1980 AUG 19.0		1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820
JD 2444460.5 1980 AUG 9.0		1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764
JD 2444450.5 1980 JUL 30.0		1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	0
JD 2444440.5 1980 JUL 20.0		1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	0	0

(FLT T)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)

JD2444200.5 1979 NOV 23.0 JD2444240.5 1980 JAN 2.0 JD2444280.5 1980 FEB 11.0 JD2444320.5 1980 MAR 22.0 JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

M18
E10

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

	(FLT T)(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)
JD 2444560.5	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
1980 NOV 17.0	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314
JD 2444550.5	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228
1980 NOV 7.0	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340
JD 2444540.5	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243
1980 OCT 28.0	366	366	366	366	366	366	366	366	366	366	346	366	366	366	366	366	366	366	366	366	366
JD 2444530.5	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257
1980 OCT 18.0	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394
JD 2444520.5	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272
1980 OCT 8.0	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421
JD 2444510.5	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	0
1980 SEP 28.0	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	0
JD 2444500.5	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
1980 SEP 18.0	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479
JD 2444490.5	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313
1980 SEP 8.0	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509
JD 2444480.5	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326
1980 AUG 29.0	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540
JD 2444470.5	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338
1980 AUG 19.0	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573
JD 2444460.5	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
1980 AUG 9.0	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606
JD 2444450.5	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	0
1980 JUL 30.0	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	0
JD 2444440.5	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	0	0
1980 JUL 20.0	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	0	0	0

(FLT T)(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)
678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	0	0

JD2444200.5
1979 NOV 23.0

JD2444240.5
1980 JAN 2.0

JD2444280.5
1980 FEB 11.0

JD2444320.5
1980 MAR 22.0

JD2444360.5
1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M18 E10

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)
JD 2444560.5	2273	2172	2071	1969	1869	1762	1662	1561	1460	1359	1258	1158	1059	960	862	764	667	570	473	378	282
1980 NOV 17.0	-2	95	193	290	385	486	576	666	753	837	918	997	1072	1146	1217	1285	1352	1418	1482	1546	1609
JD 2444550.5	2214	2113	2011	1910	1816	1704	1603	1502	1400	1299	1199	1099	999	900	802	704	607	510	414	318	223
1980 NOV 7.0	25	123	222	319	406	514	607	697	785	869	951	1030	1106	1179	1250	1320	1387	1453	1518	1582	1646
JD 2444540.5	2155	2054	1953	1852	1747	1646	1545	1443	1342	1241	1140	1040	941	842	744	646	548	452	355	259	164
1980 OCT 28.0	50	149	247	345	447	542	636	727	815	900	983	1062	1138	1212	1284	1353	1421	1487	1553	1618	1683
JD 2444530.5	2098	1997	1895	1786	1690	1589	1487	1385	1284	1183	1083	983	883	784	686	588	491	394	298	202	106
1980 OCT 18.0	72	171	270	381	471	568	663	755	844	930	1013	1093	1170	1244	1316	1386	1454	1522	1588	1655	1722
JD 2444520.5	2041	1940	1839	1735	1634	1532	1430	1329	1227	1126	1026	926	826	727	629	531	434	337	241	145	50
1980 OCT 8.0	91	190	290	394	494	592	688	782	872	959	1043	1123	1201	1276	1348	1419	1488	1556	1624	1692	1762
JD 2444510.5	1985	1884	1780	1680	1578	1476	1375	1273	1172	1071	970	870	771	672	573	475	378	281	185	89	0
1980 SEP 28.0	106	207	313	413	514	614	712	807	898	986	1071	1152	1231	1306	1380	1451	1521	1590	1660	1731	0
JD 2444500.5	1930	1830	1727	1625	1524	1422	1320	1218	1117	1016	915	815	716	617	518	421	323	227	130	35	3538
1980 SEP 18.0	119	220	325	429	532	634	734	830	923	1012	1098	1181	1260	1336	1411	1483	1554	1625	1697	1772	-1761
JD 2444490.5	1876	1774	1673	1572	1470	1368	1266	1164	1063	962	861	761	662	563	465	367	269	173	76	3579	3484
1980 SEP 8.0	128	232	337	442	548	652	753	852	946	1037	1124	1208	1288	1366	1441	1515	1588	1661	1737	-1786	-1733
JD 2444480.5	1824	1722	1620	1519	1417	1315	1213	1111	1010	909	808	708	609	510	412	314	216	120	24	3527	3431
1980 AUG 29.0	134	239	345	453	561	667	771	872	968	1061	1150	1235	1316	1395	1472	1547	1623	1699	1779	-1757	-1706
JD 2444470.5	1771	1670	1568	1467	1365	1263	1161	1059	958	857	756	656	557	458	359	262	164	68	3571	3475	3379
1980 AUG 19.0	138	243	351	461	571	680	787	890	989	1084	1174	1261	1344	1424	1503	1580	1658	1739	-1782	-1730	-1681
JD 2444460.5	1720	1619	1517	1415	1313	1212	1110	1008	907	806	705	605	506	407	308	210	113	16	3520	3424	3328
1980 AUG 9.0	137	243	353	465	578	690	800	906	1008	1105	1197	1286	1371	1453	1533	1614	1696	1784	-1755	-1705	-1657
JD 2444450.5	1670	1568	1467	1365	1263	1161	1059	958	856	755	655	555	455	356	258	160	63	3566	3470	3374	0
1980 JUL 30.0	133	240	351	465	582	697	810	920	1025	1124	1219	1310	1397	1482	1565	1649	1737	-1780	-1729	-1681	0
JD 2444440.5	1620	1519	1417	1315	1214	1112	1010	908	807	706	605	505	406	307	208	111	13	3516	3420	0	0
1980 JUL 20.0	126	233	345	462	581	701	818	931	1039	1142	1240	1333	1423	1510	1598	1687	1785	-1754	-1705	0	0
(FLT T)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

M18
E10

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)
JD 2444560.5	213	259	345	539	1325	2410	660	387	281	225	194	174	163	158	157	161	171	187	213	256	332
1980 NOV 17.0	222	224	229	237	248	264	282	304	330	360	394	432	475	523	574	629	686	746	805	862	914
JD 2444550.5	221	281	405	766	6341	881	433	293	227	190	168	155	148	146	148	155	167	188	221	277	386
1980 NOV 7.0	220	223	229	238	248	267	287	310	338	370	406	448	493	543	597	655	715	776	835	892	941
JD 2444540.5	230	311	507	1481	1461	504	310	229	186	161	146	138	134	134	139	148	163	188	230	305	474
1980 OCT 28.0	219	223	229	239	254	271	292	317	346	381	420	463	512	565	622	682	744	806	865	920	964
JD 2444530.5	242	357	726	5937	632	333	231	181	153	136	126	121	120	123	129	140	159	189	242	348	651
1980 OCT 18.0	218	222	230	243	256	274	297	323	355	392	433	480	531	587	647	709	773	836	895	946	983
JD 2444520.5	259	437	1557	940	369	234	175	144	125	114	108	106	106	110	119	132	154	190	259	422	1217
1980 OCT 8.0	218	223	231	243	258	278	302	330	364	403	447	496	551	610	672	737	803	866	923	968	996
JD 2444510.5	284	618	2677	434	239	169	133	113	101	94	91	90	93	98	107	122	147	191	284	582	0
1980 SEP 28.0	217	223	232	244	261	281	307	337	373	414	461	514	571	633	699	766	833	895	948	986	0
JD 2444500.5	330	1448	586	248	160	121	100	88	80	76	74	75	78	84	95	111	139	193	330	1233	689
1980 SEP 18.0	218	223	233	246	263	285	312	344	382	426	476	531	592	658	726	795	862	923	971	998	998
JD 2444490.5	438	1306	265	150	107	85	72	65	61	58	58	60	64	70	80	97	128	196	438	1634	290
1980 SEP 8.0	218	225	234	248	266	289	317	351	391	438	490	550	614	683	754	825	892	949	988	1000	997
JD 2444480.5	1019	307	135	88	67	56	49	45	42	42	42	44	48	54	63	80	113	201	1018	329	144
1980 AUG 29.0	219	226	236	250	268	292	322	358	400	450	506	568	636	708	782	854	920	972	999	999	1000
JD 2444470.5	498	112	64	46	37	31	28	26	25	25	26	28	30	35	43	57	89	214	498	116	67
1980 AUG 19.0	221	227	237	252	271	296	327	365	410	462	522	588	660	735	811	884	947	989	1000	1000	1006
JD 2444460.5	62	28	18	14	12	10	9	9	9	9	9	10	11	13	17	24	44	304	62	29	19
1980 AUG 9.0	223	229	240	254	274	300	332	372	419	475	538	608	684	763	841	913	970	999	1000	1004	1016
JD 2444450.5	34	19	14	11	9	8	8	8	8	8	8	9	11	13	17	27	69	128	34	20	0
1980 JUL 30.0	226	232	242	257	277	303	337	379	429	488	555	629	709	791	871	941	989	1000	1002	1011	0
JD 2444440.5	76	50	38	31	28	25	24	24	24	25	27	30	36	46	66	123	1006	162	76	0	0
1980 JUL 20.0	230	236	246	260	281	308	343	386	439	501	572	651	735	821	902	967	999	1001	1007	0	0
(FLT T)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E10

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)
JD 2444560.5	988	-982	-973	-959	-940	-913	-883	-846	-803	-755	-701	-642	-579	-513	-444	-374	-305	-239	-176	-119	-71
1960 NOV 17.0	1551	1551	1553	1557	1562	1570	1578	1586	1595	1605	1614	1623	1631	1638	1643	1646	1647	1644	1638	1627	1613
JD 2444550.5	-986	-981	-970	-954	-935	-904	-871	-832	-786	-735	-678	-616	-551	-482	-411	-340	-271	-205	-145	-91	-48
1980 NOV 7.0	1545	1546	1548	1552	1555	1565	1573	1582	1591	1600	1610	1618	1625	1631	1635	1637	1636	1631	1623	1611	1595
JD 2444540.5	-986	-979	-967	-949	-925	-896	-860	-818	-769	-715	-655	-590	-522	-451	-379	-307	-238	-173	-115	-66	-28
1980 OCT 28.0	1540	1541	1544	1548	1555	1561	1569	1578	1587	1596	1605	1613	1619	1624	1627	1627	1625	1619	1608	1594	1576
JD 2444530.5	-985	-977	-963	-942	-918	-887	-849	-804	-752	-695	-632	-564	-493	-420	-346	-274	-205	-143	-88	-43	-12
1980 OCT 18.0	1536	1538	1540	1547	1551	1558	1566	1574	1583	1591	1600	1607	1613	1617	1619	1617	1613	1605	1593	1577	1557
JD 2444520.5	-984	-975	-960	-939	-912	-878	-837	-790	-735	-675	-609	-538	-464	-389	-314	-242	-174	-114	-63	-24	-2
1980 OCT 8.0	1533	1535	1538	1543	1548	1555	1562	1571	1579	1587	1595	1601	1606	1609	1610	1607	1601	1592	1578	1560	1539
JD 2444510.5	-984	-973	-957	-935	-906	-870	-827	-776	-719	-655	-585	-512	-436	-359	-283	-211	-144	-87	-41	-10	0
1980 SEP 28.0	1532	1533	1537	1541	1546	1552	1560	1567	1575	1583	1590	1596	1600	1602	1601	1597	1590	1579	1564	1545	0
JD 2444500.5	-983	-972	-954	-931	-900	-862	-816	-763	-702	-635	-562	-486	-407	-328	-252	-180	-116	-62	-22	-1	2
1980 SEP 18.0	1531	1532	1536	1539	1545	1551	1557	1565	1572	1579	1585	1590	1593	1594	1592	1587	1578	1566	1550	1531	-2243
JD 2444490.5	-982	-970	-952	-927	-895	-855	-806	-750	-686	-615	-539	-460	-379	-298	-221	-151	-89	-40	-8	0	5
1980 SEP 8.0	1532	1533	1536	1540	1544	1550	1556	1563	1569	1576	1581	1585	1587	1587	1584	1578	1568	1555	1539	-2294	-3683
JD 2444480.5	-982	-969	-950	-924	-890	-848	-797	-737	-670	-596	-517	-434	-351	-269	-192	-122	-64	-21	-0	2	7
1980 AUG 29.0	1535	1536	1538	1541	1545	1550	1555	1561	1567	1573	1577	1581	1582	1580	1576	1569	1559	1546	1532	-3813	-9999
JD 2444470.5	-981	-969	-949	-922	-887	-842	-788	-726	-655	-577	-494	-408	-323	-239	-163	-95	-42	-7	0	4	8
1980 AUG 19.0	1539	1540	1542	1544	1547	1551	1556	1561	1566	1571	1575	1577	1577	1575	1570	1563	1553	1542	-3989	-9999	-9999
JD 2444460.5	-981	-969	-949	-921	-884	-837	-780	-714	-640	-558	-472	-383	-295	-211	-134	-70	-22	-0	1	5	7
1980 AUG 9.0	1547	1547	1548	1549	1552	1555	1558	1562	1566	1570	1573	1574	1574	1571	1566	1559	1551	1545	-9999	-9999	-9999
JD 2444450.5	-982	-969	-949	-920	-882	-833	-774	-704	-626	-541	-449	-357	-267	-182	-107	-46	-7	0	3	5	0
1980 JUL 30.0	1557	1557	1557	1558	1559	1560	1563	1566	1569	1571	1573	1574	1573	1570	1565	1560	1557	-9999	-9999	-9999	0
JD 2444440.5	-982	-969	-949	-920	-881	-830	-768	-695	-612	-522	-428	-332	-239	-154	-80	-26	0	1	3	0	0
1980 JUL 20.0	-1570	-1570	-1569	-1568	-1568	1569	1570	1571	1573	1575	1576	1576	1575	1572	1570	-1568	-1576	-9999	-9999	0	0
(FLT T)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E10

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)
JD 2444560.5	210	201	192	183	175	166	158	151	143	136	129	122	116	110	104	99	94	89	85	81	77
1980 NOV 17.0	271	262	253	243	234	225	216	207	198	190	181	173	165	158	150	143	136	129	123	116	110
JD 2444550.5	205	196	187	178	170	161	154	146	138	131	124	118	112	106	100	95	90	86	81	77	73
1980 NOV 7.0	264	255	246	236	227	218	209	200	191	183	175	167	159	151	144	137	130	123	117	110	104
JD 2444540.5	199	190	182	173	165	156	149	141	134	127	120	113	107	102	96	91	86	82	78	74	70
1980 OCT 28.0	257	248	238	229	220	211	202	193	185	176	168	160	152	145	137	130	124	117	110	104	98
JD 2444530.5	194	185	177	167	160	152	144	136	129	122	115	109	103	97	92	87	82	78	74	70	66
1980 OCT 18.0	250	241	231	222	213	204	195	186	178	170	161	153	146	138	131	124	117	111	104	98	92
JD 2444520.5	189	180	172	163	155	147	139	131	124	117	111	105	99	93	88	83	78	74	70	66	62
1980 OCT 8.0	243	234	224	215	206	197	188	180	171	163	155	147	139	132	125	118	111	105	98	92	86
JD 2444510.5	184	175	166	158	150	142	134	127	120	113	106	100	94	89	84	79	74	70	66	62	0
1980 SEP 28.0	236	227	217	208	199	190	181	173	164	156	148	140	133	125	118	111	105	98	92	86	0
JD 2444500.5	179	170	161	153	145	137	129	122	115	108	102	96	90	85	80	75	70	66	62	58	5663
1980 SEP 18.0	229	220	210	201	192	183	174	166	158	149	141	134	126	119	112	105	98	92	86	79	208
JD 2444490.5	174	165	157	148	140	132	125	117	110	104	97	91	86	80	75	71	66	62	58	9999	3649
1980 SEP 8.0	222	213	203	194	185	176	168	159	151	143	135	127	120	112	105	99	92	86	79	208	196
JD 2444480.5	169	160	152	143	135	127	120	113	106	99	93	87	81	76	71	67	62	58	54	5891	3018
1980 AUG 29.0	215	206	196	187	178	169	161	152	144	136	128	121	113	106	99	92	86	79	73	197	184
JD 2444470.5	164	155	147	138	130	123	115	108	101	95	88	83	77	72	67	62	58	54	9999	4142	2793
1980 AUG 19.0	208	199	189	180	171	163	154	145	137	129	121	114	107	99	93	86	79	73	196	184	170
JD 2444460.5	159	150	142	134	126	118	110	103	96	90	84	78	73	68	63	58	54	49	6582	3564	2774
1980 AUG 9.0	201	192	182	173	164	156	147	139	130	123	115	107	100	93	86	79	73	66	184	170	155
JD 2444450.5	154	146	137	129	121	113	106	99	92	85	79	74	68	63	58	54	49	9999	4902	3398	0
1980 JUL 30.0	194	185	176	166	158	149	140	132	124	116	108	101	93	86	79	73	66	184	170	156	0
JD 2444440.5	149	141	132	124	116	108	101	94	87	81	75	69	64	59	54	49	45	7795	4362	0	0
1980 JUL 20.0	187	178	169	160	151	142	133	125	117	109	101	94	87	80	73	66	59	171	156	0	0

(FLT T)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)

JD2444200.5 1979 NOV 23.0

JD2444240.5 1980 JAN 2.0

JD2444280.5 1980 FEB 11.0

JD2444320.5 1980 MAR 22.0

JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M18 E10

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)
JD 2444560.5 1980 NOV 17.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444550.5 1980 NOV 7.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444540.5 1980 OCT 28.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444530.5 1980 OCT 18.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444520.5 1980 OCT 8.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444510.5 1980 SEP 28.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0
JD 2444500.5 1980 SEP 18.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444490.5 1980 SEP 8.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444480.5 1980 AUG 29.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444470.5 1980 AUG 19.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444460.5 1980 AUG 9.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444450.5 1980 JUL 30.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0
JD 2444440.5 1980 JUL 20.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0

(FLT T)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)

JD2444200.5 1979 NOV 23.0 JD2444240.5 1980 JAN 2.0 JD2444280.5 1980 FEB 11.0 JD2444320.5 1980 MAR 22.0 JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

M18
E10

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

	(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)
JD 2444560.5		366	375	394	436	631	1033	563	587	646	722	811	914	1029	1157	1298	1453	1620	1802	1998	2207	2432
1980 NOV 17.0		275	279	290	320	493	912	429	422	453	500	558	628	708	799	902	1017	1143	1282	1434	1600	1780
JD 2444550.5		367	379	405	479	2751	569	551	601	669	752	847	956	1078	1214	1363	1526	1703	1894	2101	2322	2560
1980 NOV 7.0		257	263	278	337	2232	439	383	402	440	491	553	626	710	806	915	1035	1169	1316	1477	1653	1847
JD 2444540.5		368	384	422	665	688	522	558	618	693	782	884	1000	1129	1273	1430	1603	1789	1991	2209	2444	2697
1980 OCT 28.0		242	250	273	489	570	356	358	386	428	482	547	624	713	814	928	1055	1196	1352	1524	1713	1922
JD 2444530.5		370	391	460	2570	506	519	570	637	718	813	922	1045	1182	1333	1500	1682	1879	2093	2324	2574	2846
1980 OCT 18.0		230	240	290	2136	349	322	340	373	418	474	542	623	716	822	943	1077	1227	1393	1578	1782	2010
JD 2444520.5		373	402	677	535	484	524	583	657	743	844	960	1090	1235	1396	1572	1765	1974	2201	2447	2716	3010
1980 OCT 8.0		220	235	474	397	296	301	325	361	408	467	538	622	720	832	959	1102	1262	1440	1640	1863	2115
JD 2444510.5		376	429	1103	458	484	534	598	676	769	876	999	1137	1291	1461	1648	1852	2074	2317	2581	2872	0
1980 SEP 28.0		213	246	943	283	272	286	313	350	399	460	534	622	725	844	979	1131	1303	1495	1713	1960	0
JD 2444500.5		381	630	450	448	488	544	613	696	795	908	1038	1185	1348	1528	1727	1944	2182	2442	2729	3048	3519
1980 SEP 18.0		211	419	297	252	258	275	303	341	391	455	532	624	733	858	1002	1165	1351	1561	1801	2078	2925
JD 2444490.5		394	590	419	449	495	554	627	716	820	941	1078	1234	1407	1599	1810	2043	2298	2581	2895	3634	3804
1980 SEP 8.0		216	472	243	239	249	268	296	334	385	450	531	628	743	876	1030	1207	1409	1641	1911	2987	3340
JD 2444480.5		500	399	416	452	501	564	642	735	846	974	1120	1285	1469	1674	1900	2150	2427	2736	3086	3899	4270
1980 AUG 29.0		304	244	230	234	245	263	291	329	381	448	532	634	756	899	1065	1258	1481	1741	2049	3384	3941
JD 2444470.5		403	390	417	456	507	574	656	755	872	1007	1162	1338	1534	1753	1997	2267	2571	2915	3999	4348	4958
1980 AUG 19.0		277	229	229	234	245	262	289	327	380	449	537	644	774	929	1110	1322	1572	1869	3432	3972	4762
JD 2444460.5		372	390	418	459	513	583	669	774	897	1041	1206	1393	1604	1839	2103	2400	2737	3126	4431	5026	5953
1980 AUG 9.0		233	232	235	240	250	266	291	329	382	453	545	660	799	967	1166	1404	1688	2034	4005	4788	5885
JD 2444450.5		372	391	420	462	518	591	682	793	924	1077	1253	1453	1679	1934	2222	2551	2932	4518	5096	6015	0
1980 JUL 30.0		243	245	247	252	260	274	298	335	389	462	559	681	833	1017	1240	1510	1840	4043	4814	5909	0
JD 2444440.5		374	392	421	464	523	599	695	811	950	1113	1302	1517	1762	2040	2360	2730	3170	5168	6076	0	0
1980 JUL 20.0		261	264	266	269	276	288	311	347	401	478	580	712	878	1083	1336	1649	2042	4841	5933	0	0
	(FLT T)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E10

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)
JD 2444560.5	641	653	684	756	1124	1944	992	1009	1100	1222	1370	1542	1737	1956	2200	2469	2764	3084	3432	3807	4213
1980 NOV 17.0	2273	2172	2071	1969	1869	1762	1662	1561	1460	1359	1258	1158	1059	960	862	764	667	570	473	378	282
JD 2444550.5	624	642	683	816	4983	1009	935	1003	1109	1243	1400	1582	1789	2020	2278	2561	2872	3210	3577	3975	4407
1980 NOV 7.0	2214	2113	2011	1910	1816	1704	1603	1502	1400	1299	1199	1099	999	900	802	704	607	510	414	318	223
JD 2444540.5	611	633	695	1155	1258	879	916	1004	1122	1264	1431	1624	1842	2087	2358	2658	2986	3344	3733	4157	4619
1980 OCT 28.0	2155	2054	1953	1852	1747	1646	1545	1443	1342	1241	1140	1040	941	842	744	646	548	452	355	259	164
JD 2444530.5	600	630	750	4706	855	840	909	1010	1136	1287	1464	1667	1898	2156	2443	2759	3107	3486	3902	4356	4856
1980 OCT 18.0	2098	1997	1895	1786	1690	1589	1487	1385	1284	1183	1083	983	883	784	686	588	491	394	298	202	106
JD 2444520.5	593	637	1151	931	780	826	908	1017	1151	1311	1498	1712	1955	2228	2532	2867	3236	3641	4087	4579	5125
1980 OCT 8.0	2041	1940	1839	1735	1634	1532	1430	1329	1227	1126	1026	926	826	727	629	531	434	337	241	145	50
JD 2444510.5	590	675	2045	742	756	820	911	1027	1168	1336	1533	1759	2016	2305	2626	2983	3377	3812	4294	4832	0
1980 SEP 28.0	1985	1884	1780	1680	1578	1476	1375	1273	1172	1071	970	870	771	672	573	475	378	281	185	89	0
JD 2444500.5	592	1048	747	701	746	819	916	1038	1186	1363	1570	1809	2081	2387	2729	3109	3533	4003	4530	5126	6444
1980 SEP 18.0	1930	1830	1727	1625	1524	1422	1320	1218	1117	1016	915	815	716	617	518	421	323	227	130	35	3538
JD 2444490.5	609	1062	662	688	744	822	923	1050	1205	1391	1609	1862	2150	2475	2841	3249	3707	4222	4806	6621	7144
1980 SEP 8.0	1876	1774	1673	1572	1470	1368	1266	1164	1063	962	861	761	662	563	465	367	269	173	76	3579	3484
JD 2444480.5	803	644	646	686	746	827	932	1065	1227	1422	1652	1919	2225	2573	2965	3407	3908	4478	5135	7283	8211
1980 AUG 29.0	1824	1722	1620	1519	1417	1315	1213	1111	1010	909	808	708	609	510	412	314	216	120	24	3527	3431
JD 2444470.5	680	619	646	690	752	836	944	1082	1251	1456	1699	1982	2308	2682	3106	3589	4143	4784	7431	8320	9720
1980 AUG 19.0	1771	1670	1568	1467	1365	1263	1161	1059	958	857	756	656	557	458	359	262	164	68	3571	3475	3379
JD 2444460.5	605	622	653	699	763	848	960	1102	1279	1495	1751	2053	2403	2806	3269	3803	4425	5160	8436	9814	9999
1980 AUG 9.0	1720	1619	1517	1415	1313	1212	1110	1008	907	806	705	605	506	407	308	210	113	16	3520	3424	3328
JD 2444450.5	615	636	667	713	778	865	980	1127	1312	1539	1811	2134	2512	2951	3462	4061	4772	8560	9910	9999	0
1980 JUL 30.0	1670	1568	1467	1365	1263	1161	1059	958	856	755	655	555	455	356	258	160	63	3566	3470	3374	0
JD 2444440.5	635	655	687	733	798	887	1005	1158	1352	1591	1882	2229	2640	3124	3696	4379	5213	9999	9999	0	0
1980 JUL 20.0	1620	1519	1417	1315	1214	1112	1010	908	807	706	605	505	406	307	208	111	13	3516	3420	0	0

(FLT T)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

M18
E11

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444500.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671728	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.609	DEGREES
MEAN ANOM. AT EPOCH	=	254.464	DEGREES
DATE OF NODAL PASSAGE	=	2444505.371	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444500.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338765	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.409	DEGREES
ARG. OF PERIHELION	=	286.295	DEGREES
MEAN ANOM. AT EPOCH	=	287.922	DEGREES
DATE OF NODAL PASSAGE	=	2444072.517	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.064	DEGREES

M18
E11

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)
JD 2444560.5	1011	1097	1188	1242	1159	1153	1210	1322	1490	1724	2050	0	0	0	0	0	0	0	0	0	0
1980 NOV 17.0	689	757	830	891	846	887	991	1146	1351	1618	1973	0	0	0	0	0	0	0	0	0	0
JD 2444550.5	1057	1148	1245	1205	1185	1233	1340	1504	1737	2063	0	0	0	0	0	0	0	0	0	0	0
1980 NOV 7.0	712	785	865	876	904	1002	1154	1359	1627	1985	0	0	0	0	0	0	0	0	0	0	0
JD 2444540.5	1105	1202	1254	1221	1259	1359	1520	1751	2078	0	0	0	0	0	0	0	0	0	0	0	2407
1980 OCT 28.0	738	817	909	924	1014	1163	1368	1637	1996	0	0	0	0	0	0	0	0	0	0	0	2169
JD 2444530.5	1158	1262	1261	1288	1381	1538	1768	2093	0	0	0	0	0	0	0	0	0	0	0	1992	1679
1980 OCT 18.0	768	856	947	1028	1173	1376	1646	2008	0	0	0	0	0	0	0	0	0	0	0	1920	1592
JD 2444520.5	1216	1304	1320	1406	1558	1785	2110	0	0	0	0	0	0	0	0	0	0	0	0	1967	1850	1431
1980 OCT 8.0	804	972	1043	1183	1385	1656	2019	0	0	0	0	0	0	0	0	0	0	0	0	1908	1700	1332
JD 2444510.5	0	1355	1432	1579	1804	2128	0	0	0	0	0	0	0	0	0	0	0	0	1950	1670	1429	1247
1980 SEP 28.0	0	1060	1194	1394	1665	2030	0	0	0	0	0	0	0	0	0	0	0	0	1900	1586	1334	1134
JD 2444500.5	1393	1461	1602	1823	2147	0	0	0	0	0	0	0	0	0	0	0	0	1931	1641	1467	1243	1104
1980 SEP 18.0	1079	1207	1403	1674	2041	0	0	0	0	0	0	0	0	0	0	0	0	1892	1574	1363	1135	975
JD 2444490.5	1492	1627	1844	2167	0	0	0	0	0	0	0	0	0	0	0	0	0	1909	1624	1422	1238	1100	989
1980 SEP 8.0	1220	1413	1682	2051	0	0	0	0	0	0	0	0	0	0	0	0	0	1882	1568	1333	1137	977	846
JD 2444480.5	1653	1866	2187	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1881	1604	1394	1239	1094	985	896
1980 AUG 29.0	1423	1691	2060	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1869	1562	1324	1144	979	849	739
JD 2444470.5	1888	2207	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1849	1581	1376	1220	1086	979	892	820
1980 AUG 19.0	1700	2070	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1853	1553	1320	1134	981	852	742	648
JD 2444460.5	2228	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1810	1553	1356	1200	1075	971	886	815	756
1980 AUG 9.0	2078	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1833	1542	1314	1131	981	854	746	652	571
JD 2444450.5	0	0	0	0	0	0	0	0	0	0	0	0	1767	1521	1332	1182	1061	961	878	809	752	704
1980 JUL 30.0	0	0	0	0	0	0	0	0	0	0	0	0	1809	1527	1306	1127	980	855	748	656	575	504
JD 2444440.5	0	0	0	0	0	0	0	0	0	0	0	1717	1483	1303	1160	1044	952	868	802	746	699	660
1980 JUL 20.0	0	0	0	0	0	0	0	0	0	0	0	1782	1509	1295	1122	978	856	750	659	580	509	447
(FLT T)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E11

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

	(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)
JD 2444560.5		-163	-179	-193	92	76	58	39	18	-4	-28	-53	0	0	0	0	0	0	0	0	0	0
1980 NOV 17.0		2187	2242	2297	1617	1653	1690	1730	1774	1823	1876	1933	0	0	0	0	0	0	0	0	0	0
JD 2444550.5		-155	-171	-185	105	89	71	52	30	7	-17	0	0	0	0	0	0	0	0	0	0	0
1980 NOV 7.0		2163	2216	2268	1575	1612	1650	1693	1740	1792	1847	0	0	0	0	0	0	0	0	0	0	0
JD 2444540.5		-145	-161	133	119	103	85	65	43	19	0	0	0	0	0	0	0	0	0	0	0	491
1980 OCT 28.0		2138	2189	1496	1532	1570	1612	1658	1708	1762	0	0	0	0	0	0	0	0	0	0	0	659
JD 2444530.5		-135	-151	146	132	116	98	78	55	0	0	0	0	0	0	0	0	0	0	0	318	157
1980 OCT 18.0		2113	2161	1451	1488	1529	1574	1623	1676	0	0	0	0	0	0	0	0	0	0	0	878	960
JD 2444520.5		-125	171	159	145	129	111	90	0	0	0	0	0	0	0	0	0	0	0	271	-19	195
1980 OCT 8.0		2086	1368	1405	1445	1489	1538	1590	0	0	0	0	0	0	0	0	0	0	0	790	778	958
JD 2444510.5		0	183	171	157	141	123	0	0	0	0	0	0	0	0	0	0	0	246	325	176	209
1980 SEP 28.0		0	1319	1359	1402	1450	1502	0	0	0	0	0	0	0	0	0	0	0	700	760	863	950
JD 2444500.5		203	193	182	169	153	0	0	0	0	0	0	0	0	0	0	0	224	257	72	204	216
1980 SEP 18.0		1230	1270	1313	1361	1413	0	0	0	0	0	0	0	0	0	0	0	612	683	756	856	941
JD 2444490.5		212	203	192	179	0	0	0	0	0	0	0	0	0	0	0	201	225	309	189	216	222
1980 SEP 8.0		1179	1222	1269	1321	0	0	0	0	0	0	0	0	0	0	0	528	597	652	763	847	933
JD 2444480.5		219	211	201	0	0	0	0	0	0	0	0	0	0	0	177	198	229	133	209	222	226
1980 AUG 29.0		1128	1175	1227	0	0	0	0	0	0	0	0	0	0	0	447	513	583	675	754	839	926
JD 2444470.5		225	218	0	0	0	0	0	0	0	0	0	0	0	150	171	195	255	198	218	227	230
1980 AUG 19.0		1079	1130	0	0	0	0	0	0	0	0	0	0	0	370	432	501	564	663	745	831	919
JD 2444460.5		229	0	0	0	0	0	0	0	0	0	0	0	123	143	165	188	182	211	223	231	233
1980 AUG 9.0		1032	0	0	0	0	0	0	0	0	0	0	0	297	355	421	492	575	653	737	824	913
JD 2444450.5		0	0	0	0	0	0	0	0	0	0	0	94	114	136	156	161	205	217	227	234	236
1980 JUL 30.0		0	0	0	0	0	0	0	0	0	0	0	227	282	344	413	490	562	645	730	818	907
JD 2444440.5		0	0	0	0	0	0	0	0	0	0	65	85	106	126	137	234	210	220	230	237	239
1980 JUL 20.0		0	0	0	0	0	0	0	0	0	0	161	212	270	336	409	458	553	638	724	813	902
	(FLT T)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

M18
E11

	(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)
JD 2444560.5		-243	-246	-249	-183	-153	-117	-83	-55	-32	-13	2	0	0	0	0	0	0	0	0	0	0
1980 NOV 17.0		2591	2629	2671	3065	3176	3291	3386	3459	3516	3562	1	0	0	0	0	0	0	0	0	0	0
JD 2444550.5		-241	-245	-248	-174	-141	-108	-80	-57	-38	-21	0	0	0	0	0	0	0	0	0	0	0
1980 NOV 7.0		2566	2606	2650	3109	3224	3322	3398	3458	3505	3545	0	0	0	0	0	0	0	0	0	0	0
JD 2444540.5		-239	-244	-191	-163	-132	-105	-81	-62	-46	0	0	0	0	0	0	0	0	0	0	0	-293
1980 OCT 28.0		2544	2586	3044	3157	3258	3338	3400	3449	3490	0	0	0	0	0	0	0	0	0	0	0	1971
JD 2444530.5		-237	-243	-182	-154	-127	-105	-85	-69	0	0	0	0	0	0	0	0	0	0	0	-63	27
1980 OCT 18.0		2526	2571	3091	3194	3277	3342	3393	3435	0	0	0	0	0	0	0	0	0	0	0	1815	1888
JD 2444520.5		-235	-199	-174	-149	-127	-108	-91	0	0	0	0	0	0	0	0	0	0	0	-5	136	22
1980 OCT 8.0		2512	3026	3130	3217	3285	3338	3381	0	0	0	0	0	0	0	0	0	0	0	1762	1947	1837
JD 2444510.5		0	-191	-168	-147	-129	-113	0	0	0	0	0	0	0	0	0	0	0	32	-27	61	30
1980 SEP 28.0		0	3067	3156	3227	3282	3327	0	0	0	0	0	0	0	0	0	0	0	1705	1716	1784	1798
JD 2444500.5		-206	-185	-166	-148	-133	0	0	0	0	0	0	0	0	0	0	0	65	40	142	60	42
1980 SEP 18.0		3004	3095	3169	3227	3273	0	0	0	0	0	0	0	0	0	0	0	1647	1668	1771	1740	1763
JD 2444490.5		-200	-182	-166	-151	0	0	0	0	0	0	0	0	0	0	0	0	94	77	18	93	69	54
1980 SEP 8.0		3035	3111	3171	3220	0	0	0	0	0	0	0	0	0	0	0	0	1587	1613	1623	1684	1704	1731
JD 2444480.5		-197	-182	-168	0	0	0	0	0	0	0	0	0	0	0	0	121	108	88	146	96	80	67
1980 AUG 29.0		3053	3116	3166	0	0	0	0	0	0	0	0	0	0	0	0	1527	1555	1578	1641	1644	1670	1700
JD 2444470.5		-196	-183	0	0	0	0	0	0	0	0	0	0	0	146	135	122	83	121	105	92	79
1980 AUG 19.0		3060	3112	0	0	0	0	0	0	0	0	0	0	0	1466	1495	1522	1538	1584	1610	1639	1672
JD 2444460.5		-197	0	0	0	0	0	0	0	0	0	0	0	0	168	159	149	138	145	126	115	103	90
1980 AUG 9.0		3059	0	0	0	0	0	0	0	0	0	0	0	0	1404	1435	1463	1490	1525	1548	1578	1611	1647
JD 2444450.5		0	0	0	0	0	0	0	0	0	0	0	0	189	180	172	165	167	142	135	125	114	100
1980 JUL 30.0		0	0	0	0	0	0	0	0	0	0	0	0	1342	1374	1404	1432	1464	1485	1516	1548	1584	1625
JD 2444440.5		0	0	0	0	0	0	0	0	0	0	206	199	192	187	187	128	150	144	135	123	109	
1980 JUL 20.0		0	0	0	0	0	0	0	0	0	0	1278	1312	1343	1372	1404	1414	1453	1485	1521	1560	1605	
	(FLT T)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E11

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)
JD 2444560.5 1980 NOV 17.0	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	0	0	0	0	0	0	0	0	0	0
JD 2444550.5 1980 NOV 7.0	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	0	0	0	0	0	0	0	0	0	0	0
JD 2444540.5 1980 OCT 28.0	2113	2113	2113	2113	2113	2113	2113	2113	2113	0	0	0	0	0	0	0	0	0	0	0	2113
JD 2444530.5 1980 OCT 18.0	2081	2081	2081	2081	2081	2081	2081	2081	0	0	0	0	0	0	0	0	0	0	0	2081	2081
JD 2444520.5 1980 OCT 8.0	2046	2046	2046	2046	2046	2046	2046	0	0	0	0	0	0	0	0	0	0	0	2046	2046	2046
JD 2444510.5 1980 SEP 28.0	0	2008	2008	2008	2008	2008	0	0	0	0	0	0	0	0	0	0	0	2008	2008	2008	2008
JD 2444500.5 1980 SEP 18.0	1966	1966	1966	1966	1966	0	0	0	0	0	0	0	0	0	0	0	1966	1966	1966	1966	1966
JD 2444490.5 1980 SEP 8.0	1921	1921	1921	1921	0	0	0	0	0	0	0	0	0	0	0	0	1921	1921	1921	1921	1921	1921
JD 2444480.5 1980 AUG 29.0	1873	1873	1873	0	0	0	0	0	0	0	0	0	0	0	0	1873	1873	1873	1873	1873	1873	1873
JD 2444470.5 1980 AUG 19.0	1820	1820	0	0	0	0	0	0	0	0	0	0	0	0	1820	1820	1820	1820	1820	1820	1820	1820
JD 2444460.5 1980 AUG 9.0	1764	0	0	0	0	0	0	0	0	0	0	0	0	1764	1764	1764	1764	1764	1764	1764	1764	1764
JD 2444450.5 1980 JUL 30.0	0	0	0	0	0	0	0	0	0	0	0	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703
JD 2444440.5 1980 JUL 20.0	0	0	0	0	0	0	0	0	0	0	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639
(FLT T)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E11

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)
JD 2444560.5	212	212	212	212	212	212	212	212	212	212	212	0	0	0	0	0	0	0	0	0	0
1980 NOV 17.0	314	314	314	314	314	314	314	314	314	314	314	0	0	0	0	0	0	0	0	0	0
JD 2444550.5	228	228	228	228	228	228	228	228	228	228	0	0	0	0	0	0	0	0	0	0	0
1980 NOV 7.0	340	340	340	340	340	340	340	340	340	340	0	0	0	0	0	0	0	0	0	0	0
JD 2444540.5	243	243	243	243	243	243	243	243	243	0	0	0	0	0	0	0	0	0	0	0	243
1980 OCT 28.0	366	366	366	366	366	366	366	366	366	0	0	0	0	0	0	0	0	0	0	0	366
JD 2444530.5	257	257	257	257	257	257	257	257	0	0	0	0	0	0	0	0	0	0	0	257	257
1980 OCT 18.0	394	394	394	394	394	394	394	394	0	0	0	0	0	0	0	0	0	0	0	394	394
JD 2444520.5	272	272	272	272	272	272	272	0	0	0	0	0	0	0	0	0	0	0	272	272	272
1980 OCT 8.0	421	421	421	421	421	421	421	0	0	0	0	0	0	0	0	0	0	0	421	421	421
JD 2444510.5	0	286	286	286	286	286	0	0	0	0	0	0	0	0	0	0	0	286	286	286	286
1980 SEP 28.0	0	450	450	450	450	450	0	0	0	0	0	0	0	0	0	0	0	450	450	450	450
JD 2444500.5	300	300	300	300	300	0	0	0	0	0	0	0	0	0	0	0	300	300	300	300	300
1980 SEP 18.0	479	479	479	479	479	0	0	0	0	0	0	0	0	0	0	0	479	479	479	479	479
JD 2444490.5	313	313	313	313	0	0	0	0	0	0	0	0	0	0	0	313	313	313	313	313	313
1980 SEP 8.0	509	509	509	509	0	0	0	0	0	0	0	0	0	0	0	509	509	509	509	509	509
JD 2444480.5	326	326	326	0	0	0	0	0	0	0	0	0	0	0	326	326	326	326	326	326	326
1980 AUG 29.0	540	540	540	0	0	0	0	0	0	0	0	0	0	0	540	540	540	540	540	540	540
JD 2444470.5	338	338	0	0	0	0	0	0	0	0	0	0	0	338	338	338	338	338	338	338	338
1980 AUG 19.0	573	573	0	0	0	0	0	0	0	0	0	0	0	573	573	573	573	573	573	573	573
JD 2444460.5	349	0	0	0	0	0	0	0	0	0	0	0	349	349	349	349	349	349	349	349	349
1980 AUG 9.0	606	0	0	0	0	0	0	0	0	0	0	0	606	606	606	606	606	606	606	606	606
JD 2444450.5	0	0	0	0	0	0	0	0	0	0	0	359	359	359	359	359	359	359	359	359	359
1980 JUL 30.0	0	0	0	0	0	0	0	0	0	0	0	641	641	641	641	641	641	641	641	641	641
JD 2444440.5	0	0	0	0	0	0	0	0	0	0	368	368	368	368	368	368	368	368	368	368	368
1980 JUL 20.0	0	0	0	0	0	0	0	0	0	0	678	678	678	678	678	678	678	678	678	678	678
(FLT T)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E11

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)
JD 2444560.5	282	187	92	3584	3499	3404	3308	3212	3116	3019	2922	0	0	0	0	0	0	0	0	0	0
1980 NOV 17.0	1609	1672	1736	-1786	-1726	-1673	-1625	-1580	-1535	-1491	-1445	0	0	0	0	0	0	0	0	0	0
JD 2444550.5	222	127	34	3534	3440	3345	3249	3153	3057	2960	0	0	0	0	0	0	0	0	0	0	0
1980 NOV 7.0	1646	1711	1775	-1752	-1695	-1646	-1600	-1555	-1510	-1465	0	0	0	0	0	0	0	0	0	0	0
JD 2444540.5	164	69	3569	3476	3381	3286	3190	3094	2998	0	0	0	0	0	0	0	0	0	0	0	1786
1980 OCT 28.0	1683	1750	-1777	-1719	-1668	-1621	-1575	-1530	-1485	0	0	0	0	0	0	0	0	0	0	0	-944
JD 2444530.5	106	16	3514	3419	3324	3228	3133	3037	0	0	0	0	0	0	0	0	0	0	0	1752	1857
1980 OCT 18.0	1722	1788	-1743	-1690	-1642	-1596	-1550	-1505	0	0	0	0	0	0	0	0	0	0	0	-929	-986
JD 2444520.5	50	3552	3458	3363	3267	3172	3076	0	0	0	0	0	0	0	0	0	0	0	1708	1815	1913
1980 OCT 8.0	1762	-1768	-1713	-1663	-1617	-1571	-1526	0	0	0	0	0	0	0	0	0	0	0	-910	-968	-1024
JD 2444510.5	0	3497	3402	3307	3211	3116	0	0	0	0	0	0	0	0	0	0	0	1663	1763	1867	1968
1980 SEP 28.0	0	-1737	-1686	-1638	-1592	-1547	0	0	0	0	0	0	0	0	0	0	0	-891	-947	-1004	-1062
JD 2444500.5	3538	3443	3347	3252	3157	0	0	0	0	0	0	0	0	0	0	0	0	1617	1718	1821	1921	2023
1980 SEP 18.0	-1761	-1709	-1660	-1614	-1568	0	0	0	0	0	0	0	0	0	0	0	0	-873	-927	-985	-1042	-1100
JD 2444490.5	3484	3389	3294	3198	0	0	0	0	0	0	0	0	0	0	0	0	0	1570	1671	1771	1873	1975	2077
1980 SEP 8.0	-1733	-1683	-1636	-1589	0	0	0	0	0	0	0	0	0	0	0	0	0	-854	-908	-964	-1022	-1080	-1139
JD 2444480.5	3431	3336	3241	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1523	1623	1724	1825	1926	2028	2130
1980 AUG 29.0	-1706	-1658	-1611	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-835	-889	-944	-1001	-1060	-1119	-1179
JD 2444470.5	3379	3284	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1476	1575	1675	1776	1877	1978	2080	2182
1980 AUG 19.0	-1681	-1634	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-816	-869	-924	-981	-1039	-1098	-1158	-1218
JD 2444460.5	3328	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1428	1527	1626	1726	1827	1928	2029	2131	2233
1980 AUG 9.0	-1657	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-798	-850	-905	-961	-1018	-1077	-1137	-1197	-1259
JD 2444450.5	0	0	0	0	0	0	0	0	0	0	0	0	1380	1478	1577	1677	1777	1877	1978	2080	2181	2283
1980 JUL 30.0	0	0	0	0	0	0	0	0	0	0	0	0	-780	-832	-886	-941	-998	-1056	-1116	-1176	-1238	-1300
JD 2444440.5	0	0	0	0	0	0	0	0	0	0	0	1331	1429	1528	1627	1726	1826	1927	2028	2129	2231	2333
1980 JUL 20.0	0	0	0	0	0	0	0	0	0	0	0	-763	-814	-867	-921	-978	-1036	-1095	-1155	-1216	-1278	-1341
(FLT T)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E11

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

	(FLT T)(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)
JD 2444560.5	332	491	986	7339	896	468	322	251	210	185	169	0	0	0	0	0	0	0	0	0	0
1980 NOV 17.0	915	958	989	999	985	967	962	972	997	1038	1097	0	0	0	0	0	0	0	0	0	0
JD 2444550.5	386	663	2511	1284	529	339	254	207	180	162	0	0	0	0	0	0	0	0	0	0	0
1980 NOV 7.0	941	978	998	993	977	970	976	997	1033	1087	0	0	0	0	0	0	0	0	0	0	0
JD 2444540.5	474	1115	2596	626	359	256	204	173	154	0	0	0	0	0	0	0	0	0	0	0	8041
1980 OCT 28.0	964	993	999	986	977	980	998	1029	1077	0	0	0	0	0	0	0	0	0	0	0	2171
JD 2444530.5	651	4958	805	387	259	199	165	144	0	0	0	0	0	0	0	0	0	0	0	1452	1224
1980 OCT 18.0	983	1000	993	984	985	998	1025	1068	0	0	0	0	0	0	0	0	0	0	0	2246	1725
JD 2444520.5	1217	1279	430	262	192	155	133	0	0	0	0	0	0	0	0	0	0	0	662	4556	541
1980 OCT 8.0	996	998	990	989	999	1022	1059	0	0	0	0	0	0	0	0	0	0	0	2340	1782	1435
JD 2444510.5	0	507	267	184	144	121	0	0	0	0	0	0	0	0	0	0	0	381	1426	779	312
1980 SEP 28.0	0	995	992	999	1018	1051	0	0	0	0	0	0	0	0	0	0	0	2440	1851	1477	1226
JD 2444500.5	689	274	174	130	106	0	0	0	0	0	0	0	0	0	0	0	237	520	2106	954	196
1980 SEP 18.0	998	995	999	1015	1043	0	0	0	0	0	0	0	0	0	0	0	2543	1917	1521	1256	1070
JD 2444490.5	290	161	114	90	0	0	0	0	0	0	0	0	0	0	0	149	260	1167	455	193	125
1980 SEP 8.0	997	1000	1012	1035	0	0	0	0	0	0	0	0	0	0	0	2648	1986	1568	1288	1091	950
JD 2444480.5	144	94	71	0	0	0	0	0	0	0	0	0	0	0	90	137	314	955	191	108	77
1980 AUG 29.0	1000	1009	1028	0	0	0	0	0	0	0	0	0	0	0	2752	2055	1615	1320	1114	965	855
JD 2444470.5	67	48	0	0	0	0	0	0	0	0	0	0	0	47	66	116	594	188	82	54	41
1980 AUG 19.0	1006	1022	0	0	0	0	0	0	0	0	0	0	0	2853	2124	1663	1354	1138	982	866	779
JD 2444460.5	19	0	0	0	0	0	0	0	0	0	0	0	14	19	29	68	185	39	22	16	13
1980 AUG 9.0	1016	0	0	0	0	0	0	0	0	0	0	0	2948	2191	1709	1387	1161	999	878	786	717
JD 2444450.5	0	0	0	0	0	0	0	0	0	0	0	11	14	20	35	186	56	25	16	12	10
1980 JUL 30.0	0	0	0	0	0	0	0	0	0	0	0	3033	2252	1754	1419	1185	1015	889	794	722	667
JD 2444440.5	0	0	0	0	0	0	0	0	0	0	32	39	51	79	183	511	107	61	43	34	29
1980 JUL 20.0	0	0	0	0	0	0	0	0	0	0	3104	2307	1795	1450	1207	1031	901	802	727	669	625
	(FLT T)(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)

JD2444400.5
1980 JUN 10.0

JD2444440.5
1980 JUL 20.0

JD2444480.5
1980 AUG 29.0

JD2444520.5
1980 OCT 8.0

JD2444560.5
1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M18 E11

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

	(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)
JD 2444560.5		-71	-33	-8	0	12	29	42	51	54	54	50	0	0	0	0	0	0	0	0	0	0
1980 NOV 17.0		1613	1594	1571	1454	1535	1730	2175	3511	9999	9999	9999	0	0	0	0	0	0	0	0	0	0
JD 2444550.5		-48	-16	-0	5	20	33	42	47	47	45	0	0	0	0	0	0	0	0	0	0	0
1980 NOV 7.0		1595	1573	1548	1543	1730	2164	3478	9999	9999	9999	0	0	0	0	0	0	0	0	0	0	0
JD 2444540.5		-28	-5	1	12	25	34	39	41	39	0	0	0	0	0	0	0	0	0	0	0	378
1980 OCT 28.0		1576	1553	1557	1735	2161	3462	9999	9999	9999	0	0	0	0	0	0	0	0	0	0	0	9999
JD 2444530.5		-12	0	6	17	27	33	35	34	0	0	0	0	0	0	0	0	0	0	0	396	394
1980 OCT 18.0		1557	1533	1747	2167	3463	9999	9999	9999	0	0	0	0	0	0	0	0	0	0	0	9999	9999
JD 2444520.5		-2	2	11	20	26	29	29	0	0	0	0	0	0	0	0	0	0	0	419	414	416
1980 OCT 8.0		1539	1767	2181	3484	9999	9999	9999	0	0	0	0	0	0	0	0	0	0	0	9999	9999	9999
JD 2444510.5		0	6	14	20	24	25	0	0	0	0	0	0	0	0	0	0	0	444	439	437	436
1980 SEP 28.0		0	2205	3525	9999	9999	9999	0	0	0	0	0	0	0	0	0	0	0	9999	9999	9999	9999
JD 2444500.5		2	9	15	19	20	0	0	0	0	0	0	0	0	0	0	0	0	471	463	458	457	456
1980 SEP 18.0		2243	3590	9999	9999	9999	0	0	0	0	0	0	0	0	0	0	0	0	9999	9999	9999	9999	9999
JD 2444490.5		5	10	15	17	0	0	0	0	0	0	0	0	0	0	0	0	0	499	488	482	478	476	474
1980 SEP 8.0		3683	9999	9999	9999	0	0	0	0	0	0	0	0	0	0	0	0	0	9999	9999	9999	9999	9999	9999
JD 2444480.5		7	11	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	529	515	507	501	497	494	491
1980 AUG 29.0		9999	9999	9999	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9999	9999	9999	9999	9999	9999	6264
JD 2444470.5		8	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	561	544	533	525	519	515	511	506
1980 AUG 19.0		9999	9999	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9999	9999	9999	9999	9999	9999	7108	4069
JD 2444460.5		7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	593	574	560	550	543	537	531	526	520
1980 AUG 9.0		9999	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9999	9999	9999	9999	9999	9999	8153	4400	3158
JD 2444450.5		0	0	0	0	0	0	0	0	0	0	0	0	627	605	589	577	567	560	553	547	541	533
1980 JUL 30.0		0	0	0	0	0	0	0	0	0	0	0	0	9999	9999	9999	9999	9999	9999	9444	4770	3345	2665
JD 2444440.5		0	0	0	0	0	0	0	0	0	0	0	662	637	618	604	593	584	576	569	562	554	545
1980 JUL 20.0		0	0	0	0	0	0	0	0	0	0	0	9999	9999	9999	9999	9999	9999	9999	5178	3547	2791	2361
	(FLT T)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

M18
E11

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)
JD 2444560.5	77	73	70	9999	2305	1442	1163	1032	961	924	912	0	0	0	0	0	0	0	0	0	0
1980 NOV 17.0	110	104	98	239	229	218	205	192	178	163	148	0	0	0	0	0	0	0	0	0	0
JD 2444550.5	73	70	67	3564	1759	1325	1142	1049	1001	984	0	0	0	0	0	0	0	0	0	0	0
1980 NOV 7.0	104	98	92	230	218	206	193	179	164	149	0	0	0	0	0	0	0	0	0	0	0
JD 2444540.5	70	66	7796	2286	1549	1282	1154	1090	1067	0	0	0	0	0	0	0	0	0	0	0	165
1980 OCT 28.0	98	92	230	219	207	194	180	165	150	0	0	0	0	0	0	0	0	0	0	0	93
JD 2444530.5	66	63	3309	1879	1465	1284	1196	1162	0	0	0	0	0	0	0	0	0	0	0	157	182
1980 OCT 18.0	92	86	219	207	195	181	166	151	0	0	0	0	0	0	0	0	0	0	0	91	105
JD 2444520.5	62	6052	2405	1716	1449	1325	1274	0	0	0	0	0	0	0	0	0	0	0	147	172	193
1980 OCT 8.0	86	219	208	195	182	167	152	0	0	0	0	0	0	0	0	0	0	0	88	103	117
JD 2444510.5	0	3370	2078	1664	1483	1407	0	0	0	0	0	0	0	0	0	0	0	137	160	182	203
1980 SEP 28.0	0	208	196	182	168	153	0	0	0	0	0	0	0	0	0	0	0	86	100	114	127
JD 2444500.5	5663	2645	1955	1682	1567	0	0	0	0	0	0	0	0	0	0	0	127	150	172	192	211
1980 SEP 18.0	208	196	183	169	153	0	0	0	0	0	0	0	0	0	0	0	83	97	111	124	137
JD 2444490.5	3649	2373	1941	1765	0	0	0	0	0	0	0	0	0	0	0	118	140	161	182	201	219
1980 SEP 8.0	196	183	169	154	0	0	0	0	0	0	0	0	0	0	0	80	94	108	121	134	147
JD 2444480.5	3018	2292	2014	0	0	0	0	0	0	0	0	0	0	0	110	131	152	172	191	209	227
1980 AUG 29.0	184	170	154	0	0	0	0	0	0	0	0	0	0	0	78	92	105	118	131	144	156
JD 2444470.5	2793	2337	0	0	0	0	0	0	0	0	0	0	0	102	123	143	162	181	199	216	233
1980 AUG 19.0	170	155	0	0	0	0	0	0	0	0	0	0	0	75	89	102	115	128	141	153	165
JD 2444460.5	2774	0	0	0	0	0	0	0	0	0	0	0	95	114	134	153	171	189	206	223	240
1980 AUG 9.0	155	0	0	0	0	0	0	0	0	0	0	0	73	86	99	112	125	138	150	162	174
JD 2444450.5	0	0	0	0	0	0	0	0	0	0	0	88	107	126	144	162	179	196	213	229	246
1980 JUL 30.0	0	0	0	0	0	0	0	0	0	0	0	70	84	97	110	122	135	147	159	171	183
JD 2444440.5	0	0	0	0	0	0	0	0	0	0	82	100	118	136	153	170	187	203	219	235	251
1980 JUL 20.0	0	0	0	0	0	0	0	0	0	0	68	81	94	107	119	132	144	156	168	179	191
(FLT T)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E11

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)
JD 2444560.5 1980 NOV 17.0	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0
JD 2444550.5 1980 NOV 7.0	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0
JD 2444540.5 1980 OCT 28.0	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524
JD 2444530.5 1980 OCT 18.0	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524
JD 2444520.5 1980 OCT 8.0	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524
JD 2444510.5 1980 SEP 28.0	0	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524
JD 2444500.5 1980 SEP 18.0	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524
JD 2444490.5 1980 SEP 8.0	772	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524
JD 2444480.5 1980 AUG 29.0	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524
JD 2444470.5 1980 AUG 19.0	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444460.5 1980 AUG 9.0	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444450.5 1980 JUL 30.0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444440.5 1980 JUL 20.0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
(FLT T)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

M18
E11

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)
JD 2444560.5	2432	2674	2933	3084	2848	2831	2995	3315	3798	4477	5431	0	0	0	0	0	0	0	0	0	0
1980 NOV 17.0	1780	1977	2193	2370	2240	2358	2665	3122	3728	4519	5574	0	0	0	0	0	0	0	0	0	0
JD 2444550.5	2560	2816	3093	2979	2922	3060	3365	3840	4515	5469	0	0	0	0	0	0	0	0	0	0	0
1980 NOV 7.0	1847	2060	2295	2327	2410	2698	3147	3753	4547	5608	0	0	0	0	0	0	0	0	0	0	0
JD 2444540.5	2697	2971	3120	3025	3134	3422	3887	4558	5512	0	0	0	0	0	0	0	0	0	0	0	5730
1980 OCT 28.0	1922	2155	2423	2468	2733	3174	3778	4575	5642	0	0	0	0	0	0	0	0	0	0	0	6156
JD 2444530.5	2846	3143	3139	3217	3485	3939	4605	5558	0	0	0	0	0	0	0	0	0	0	0	4512	3599
1980 OCT 18.0	2010	2267	2534	2774	3202	3803	4603	5676	0	0	0	0	0	0	0	0	0	0	0	5415	4442
JD 2444520.5	3010	3263	3310	3555	3996	4656	5608	0	0	0	0	0	0	0	0	0	0	0	4439	4095	2879
1980 OCT 8.0	2115	2608	2819	3232	3829	4631	5710	0	0	0	0	0	0	0	0	0	0	0	5379	4761	3671
JD 2444510.5	0	3410	3632	4058	4710	5661	0	0	0	0	0	0	0	0	0	0	0	0	4390	3572	2875	2353
1980 SEP 28.0	0	2869	3265	3856	4658	5742	0	0	0	0	0	0	0	0	0	0	0	0	5357	4424	3678	3086
JD 2444500.5	3519	3715	4124	4768	5716	0	0	0	0	0	0	0	0	0	0	0	0	0	4335	3487	2985	2342	1945
1980 SEP 18.0	2925	3301	3883	4684	5774	0	0	0	0	0	0	0	0	0	0	0	0	0	5332	4388	3762	3090	2619
JD 2444490.5	3804	4195	4829	5774	0	0	0	0	0	0	0	0	0	0	0	0	0	4268	3437	2854	2327	1934	1624
1980 SEP 8.0	3340	3912	4710	5804	0	0	0	0	0	0	0	0	0	0	0	0	0	5302	4372	3675	3095	2625	2240
JD 2444480.5	4270	4892	5833	0	0	0	0	0	0	0	0	0	0	0	0	0	4188	3381	2773	2329	1917	1613	1366
1980 AUG 29.0	3941	4736	5832	0	0	0	0	0	0	0	0	0	0	0	0	0	5263	4353	3648	3115	2630	2249	1926
JD 2444470.5	4958	5893	0	0	0	0	0	0	0	0	0	0	0	0	4092	3314	2723	2274	1894	1597	1355	1157
1980 AUG 19.0	4762	5859	0	0	0	0	0	0	0	0	0	0	0	0	5216	4327	3636	3087	2635	2256	1936	1662
JD 2444460.5	5953	0	0	0	0	0	0	0	0	0	0	0	0	3981	3234	2664	2218	1863	1574	1339	1146	987
1980 AUG 9.0	5885	0	0	0	0	0	0	0	0	0	0	0	0	5157	4293	3619	3077	2636	2262	1946	1674	1438
JD 2444450.5	0	0	0	0	0	0	0	0	0	0	0	0	3853	3139	2594	2166	1825	1545	1317	1129	975	848
1980 JUL 30.0	0	0	0	0	0	0	0	0	0	0	0	0	5087	4250	3595	3067	2634	2265	1954	1685	1452	1248
JD 2444440.5	0	0	0	0	0	0	0	0	0	0	0	3708	3031	2512	2104	1777	1521	1290	1108	958	835	734
1980 JUL 20.0	0	0	0	0	0	0	0	0	0	0	0	5004	4197	3564	3050	2627	2268	1959	1695	1464	1262	1084
(FLT T)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M18 E11

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)
JD 2444560.5	4213	4651	5126	5454	5088	5189	5660	6437	7526	8996	9999	0	0	0	0	0	0	0	0	0	0
1980 NOV 17.0	262	187	92	3584	3499	3404	3308	3212	3116	3019	2922	0	0	0	0	0	0	0	0	0	0
JD 2444550.5	4407	4876	5389	5306	5332	5758	6512	7593	9062	9999	0	0	0	0	0	0	0	0	0	0	0
1980 NOV 7.0	222	127	34	3534	3440	3345	3249	3153	3057	2960	0	0	0	0	0	0	0	0	0	0	0
JD 2444540.5	4619	5126	5543	5493	5867	6595	7665	9133	9999	0	0	0	0	0	0	0	0	0	0	0	9999
1980 OCT 28.0	164	69	3569	3476	3381	3286	3190	3094	2998	0	0	0	0	0	0	0	0	0	0	0	1786
JD 2444530.5	4856	5410	5674	5991	6687	7742	9208	9999	0	0	0	0	0	0	0	0	0	0	0	9927	8041
1980 OCT 18.0	106	16	3514	3419	3324	3228	3133	3037	0	0	0	0	0	0	0	0	0	0	0	1752	1857
JD 2444520.5	5125	5871	6128	6787	7825	9286	9999	0	0	0	0	0	0	0	0	0	0	0	9817	8857	6550
1980 OCT 8.0	50	3552	3458	3363	3267	3172	3076	0	0	0	0	0	0	0	0	0	0	0	1708	1815	1913
JD 2444510.5	0	6279	6897	7913	9368	9999	0	0	0	0	0	0	0	0	0	0	0	9747	7997	6554	5438
1980 SEP 28.0	0	3497	3402	3307	3211	3116	0	0	0	0	0	0	0	0	0	0	0	1663	1763	1867	1968
JD 2444500.5	6444	7016	8007	9452	9999	0	0	0	0	0	0	0	0	0	0	0	0	9667	7875	6747	5432	4564
1980 SEP 18.0	3538	3443	3347	3252	3157	0	0	0	0	0	0	0	0	0	0	0	0	1617	1718	1821	1921	2023
JD 2444490.5	7144	8106	9539	9999	0	0	0	0	0	0	0	0	0	0	0	0	0	9570	7810	6529	5422	4559	3864
1980 SEP 8.0	3484	3389	3294	3198	0	0	0	0	0	0	0	0	0	0	0	0	0	1570	1671	1771	1873	1975	2077
JD 2444480.5	8211	9628	9999	0	0	0	0	0	0	0	0	0	0	0	0	0	9451	7734	6421	5445	4547	3862	3291
1980 AUG 29.0	3431	3336	3241	0	0	0	0	0	0	0	0	0	0	0	0	0	1523	1623	1724	1825	1926	2028	2130
JD 2444470.5	9720	9999	0	0	0	0	0	0	0	0	0	0	0	0	0	9308	7641	6359	5361	4529	3853	3291	2819
1980 AUG 19.0	3379	3284	0	0	0	0	0	0	0	0	0	0	0	0	0	1476	1575	1675	1776	1877	1978	2080	2182
JD 2444460.5	9999	0	0	0	0	0	0	0	0	0	0	0	0	0	9138	7527	6283	5295	4499	3836	3285	2819	2426
1980 AUG 9.0	3328	0	0	0	0	0	0	0	0	0	0	0	0	0	1428	1527	1626	1726	1827	1928	2029	2131	2233
JD 2444450.5	0	0	0	0	0	0	0	0	0	0	0	0	8940	7390	6190	5233	4458	3809	3271	2814	2426	2096
1980 JUL 30.0	0	0	0	0	0	0	0	0	0	0	0	0	1380	1478	1577	1677	1777	1877	1978	2080	2181	2283
JD 2444440.5	0	0	0	0	0	0	0	0	0	0	8712	7228	6076	5154	4404	3790	3249	2803	2422	2096	1818
1980 JUL 20.0	0	0	0	0	0	0	0	0	0	0	1331	1429	1528	1627	1726	1826	1927	2028	2129	2231	2333
(FLT T)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

M18
E12

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444620.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671714	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.614	DEGREES
MEAN ANOM. AT EPOCH	=	12.736	DEGREES
DATE OF NODAL PASSAGE	=	2444870.623	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444620.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338795	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.411	DEGREES
ARG. OF PERIHELION	=	286.299	DEGREES
MEAN ANOM. AT EPOCH	=	350.804	DEGREES
DATE OF NODAL PASSAGE	=	2444072.513	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.065	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E12

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)
JD 2444560.5	0	0	2002	1675	1434	1249	1103	986	891	813	751	702	666	642	632	642	679	760	915	1170	1332
1980 NOV 17.0	0	0	1930	1589	1333	1132	970	837	725	630	550	483	429	389	367	371	408	493	645	873	1053
JD 2444550.5	0	2020	1674	1434	1250	1104	987	893	815	753	703	666	640	628	633	661	726	851	1070	1363	1292
1980 NOV 7.0	0	1941	1588	1331	1131	969	836	724	629	549	481	426	384	359	357	386	456	582	782	1070	1020
JD 2444540.5	2407	1674	1434	1251	1106	989	895	818	755	705	666	639	625	625	646	698	800	981	1250	1324	1254
1980 OCT 28.0	2169	1588	1331	1131	969	836	724	629	548	480	423	380	352	345	366	423	528	699	933	1036	987
JD 2444530.5	1679	1433	1251	1107	991	897	820	757	707	667	639	623	620	635	675	757	906	1144	1357	1286	1216
1980 OCT 18.0	1592	1331	1131	970	837	725	630	549	480	422	377	346	335	348	394	482	626	837	1052	1003	956
JD 2444520.5	1431	1250	1107	992	898	822	759	708	668	639	621	615	625	657	723	844	1045	1318	1319	1249	1179
1980 OCT 8.0	1332	1132	971	839	727	631	550	480	422	375	341	326	332	368	441	563	747	976	1019	971	924
JD 2444510.5	1247	1106	992	899	823	760	710	670	639	620	611	617	642	695	792	959	1207	1354	1283	1213	1143
1980 SEP 28.0	1134	973	841	729	634	552	482	422	374	338	318	319	346	406	508	665	878	1033	986	940	894
JD 2444500.5	1104	991	899	824	762	711	670	640	618	608	610	629	671	750	887	1102	C	1319	1248	1177	1108
1980 SEP 18.0	975	843	732	637	555	484	423	373	335	311	307	326	375	460	592	782	0	1001	955	909	864
JD 2444490.5	989	898	824	762	711	671	639	617	605	604	618	651	715	826	1007	1258	1355	1284	1213	1143	1074
1980 SEP 8.0	846	735	640	558	487	426	374	334	307	296	308	347	418	530	694	903	1015	969	924	879	836
JD 2444480.5	896	822	761	711	671	639	616	602	599	608	635	686	777	925	1147	1393	1321	1250	1179	1110	1041
1980 AUG 29.0	739	644	562	491	429	376	334	303	288	293	323	381	475	615	805	1029	984	938	894	850	808
JD 2444470.5	820	760	710	670	638	614	599	594	599	620	662	735	857	1046	1296	1359	1288	1216	1146	1077	1009
1980 AUG 19.0	648	566	495	433	379	335	301	282	280	301	349	428	546	712	916	998	953	909	865	822	781
JD 2444460.5	756	708	668	636	612	596	589	591	607	641	701	800	957	1182	1399	1327	1255	1184	1114	1045	978
1980 AUG 9.0	571	499	437	382	337	301	277	270	283	321	386	486	629	816	1012	968	923	880	837	795	755
JD 2444450.5	704	665	633	609	592	583	584	596	623	671	752	881	1075	1322	1367	1294	1223	1152	1082	1014	948
1980 JUL 30.0	504	442	387	340	301	274	261	268	296	350	434	555	721	919	982	938	894	852	810	769	729
JD 2444440.5	660	629	605	588	578	576	585	607	646	712	818	980	1205	1407	1335	1263	1191	1121	1052	984	918
1980 JUL 20.0	447	391	343	303	273	255	255	275	318	389	491	635	818	997	953	910	867	824	783	744	705

(FLT T)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E12

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)
JD 2444560.5	0	0	158	167	153	133	108	80	50	19	-12	-43	-74	-105	-134	-162	-188	-209	-224	-227	98
1980 NOV 17.0	0	0	1161	1251	1335	1415	1494	1570	1644	1717	1788	1858	1928	1998	2069	2141	2214	2283	2338	2361	1587
JD 2444550.5	0	126	178	174	158	137	112	84	54	23	-8	-39	-71	-102	-131	-159	-184	-202	-211	128	105
1980 NOV 7.0	0	1050	1157	1242	1325	1406	1485	1561	1635	1708	1779	1849	1919	1990	2061	2132	2202	2262	2297	1506	1566
JD 2444540.5	491	179	188	179	162	141	115	88	58	27	-4	-36	-67	-98	-128	-155	-177	-191	-192	135	113
1980 OCT 28.0	660	1060	1148	1233	1316	1397	1476	1552	1626	1699	1770	1841	1912	1982	2053	2122	2186	2231	2244	1484	1545
JD 2444530.5	157	196	195	184	166	145	119	92	62	31	-0	-32	-63	-94	-123	-149	-167	-174	161	141	120
1980 OCT 18.0	960	1053	1140	1225	1308	1389	1468	1544	1619	1691	1763	1834	1905	1975	2044	2110	2162	2187	1401	1464	1525
JD 2444520.5	195	205	200	188	170	148	123	95	66	35	3	-28	-59	-90	-117	-140	-152	-152	167	147	126
1980 OCT 8.0	958	1045	1131	1216	1300	1381	1460	1537	1612	1685	1756	1828	1898	1968	2034	2091	2128	2134	1380	1444	1506
JD 2444510.5	209	211	204	192	174	152	127	99	70	39	7	-24	-55	-84	-109	-127	-132	189	172	153	132
1980 SEP 28.0	950	1037	1123	1209	1292	1374	1453	1530	1605	1679	1751	1822	1892	1959	2020	2065	2083	1296	1360	1424	1487
JD 2444500.5	216	216	208	195	177	156	131	103	74	43	11	-19	-49	-77	-98	-109	0	193	177	158	138
1980 SEP 18.0	942	1029	1116	1201	1285	1367	1447	1524	1600	1673	1745	1816	1884	1948	2000	2029	0	1275	1340	1405	1468
JD 2444490.5	222	220	212	199	181	159	134	107	78	47	16	-14	-43	-67	-83	-88	211	197	182	163	143
1980 SEP 8.0	933	1021	1109	1195	1279	1361	1441	1519	1595	1668	1740	1810	1875	1932	1972	1986	1188	1255	1321	1386	1450
JD 2444480.5	226	223	215	202	184	163	138	111	82	51	21	-8	-34	-55	-65	224	214	201	186	168	148
1980 AUG 29.0	926	1014	1102	1189	1274	1356	1436	1514	1590	1664	1735	1802	1863	1911	1936	1099	1168	1235	1302	1367	1432
JD 2444470.5	230	227	218	205	188	166	142	115	86	56	26	-1	-24	-39	-44	225	216	204	189	172	153
1980 AUG 19.0	919	1008	1096	1183	1268	1351	1432	1510	1586	1659	1728	1793	1846	1882	1893	1079	1148	1216	1283	1349	1415
JD 2444460.5	233	230	221	208	191	170	146	119	90	61	33	7	-11	-20	232	227	218	207	193	176	157
1980 AUG 9.0	913	1002	1091	1178	1264	1347	1428	1506	1581	1653	1720	1779	1824	1846	989	1059	1129	1197	1265	1332	1397
JD 2444450.5	236	233	225	212	194	173	149	123	95	67	40	18	4	-0	233	228	220	209	196	180	161
1980 JUL 30.0	907	997	1086	1174	1260	1343	1424	1502	1577	1647	1710	1762	1794	1805	970	1040	1110	1179	1247	1314	1380
JD 2444440.5	239	236	228	215	198	177	153	127	100	73	49	31	22	233	233	229	222	211	198	183	165
1980 JUL 20.0	902	992	1082	1170	1256	1340	1420	1498	1571	1638	1696	1738	1759	880	951	1021	1091	1161	1230	1297	1364
(FLT T)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E12

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)
JD 2444560.5	0	0	-57	-82	-97	-110	-122	-135	-149	-164	-181	-199	-217	-233	-242	-238	-219	-193	-173	-173	-119
1980 NOV 17.0	0	0	2040	2055	2078	2105	2136	2170	2210	2257	2314	2385	2475	2588	2727	2884	3038	3164	3239	3244	3294
JD 2444550.5	0	-3	-52	-69	-83	-96	-110	-124	-140	-158	-178	-199	-220	-236	-240	-230	-209	-190	-184	-143	-132
1980 NOV 7.0	0	1999	1994	2016	2041	2071	2104	2142	2187	2241	2309	2393	2501	2634	2788	2945	3080	3171	3199	3230	3259
JD 2444540.5	-293	-17	-40	-56	-69	-83	-98	-114	-133	-154	-177	-202	-224	-237	-236	-222	-205	-196	-203	-154	-144
1980 OCT 28.0	1971	1936	1954	1979	2007	2039	2076	2119	2170	2234	2314	2415	2542	2692	2850	2992	3097	3146	3125	3194	3222
JD 2444530.5	27	-10	-27	-41	-56	-71	-87	-106	-128	-152	-180	-206	-227	-236	-230	-217	-207	-209	-175	-165	-156
1980 OCT 18.0	1888	1895	1918	1945	1976	2011	2052	2101	2161	2236	2331	2451	2596	2753	2901	3017	3085	3088	3127	3157	3185
JD 2444520.5	22	1	-13	-28	-43	-59	-78	-100	-125	-154	-185	-212	-230	-233	-225	-217	-216	-226	-184	-176	-167
1980 OCT 8.0	1837	1857	1884	1913	1947	1987	2033	2090	2160	2250	2362	2500	2655	2807	2933	3016	3042	3003	3091	3120	3147
JD 2444510.5	30	14	0	-14	-31	-49	-71	-96	-126	-159	-192	-218	-230	-230	-224	-222	-228	-201	-193	-185	-177
1980 SEP 28.0	1798	1823	1852	1885	1922	1967	2021	2087	2170	2276	2406	2557	2711	2845	2941	2987	2971	3023	3053	3082	3109
JD 2444500.5	42	27	13	-2	-20	-41	-66	-96	-130	-167	-200	-221	-229	-228	-226	-230	0	-208	-201	-194	-186
1980 SEP 18.0	1763	1791	1823	1859	1902	1953	2015	2093	2191	2314	2459	2613	2753	2862	2925	2932	0	2986	3015	3044	3071
JD 2444490.5	54	40	25	8	-11	-35	-64	-99	-138	-176	-206	-223	-228	-229	-231	-239	-221	-215	-208	-202	-195
1980 SEP 8.0	1731	1761	1797	1837	1886	1944	2017	2109	2224	2363	2514	2659	2777	2856	2884	2854	2917	2948	2977	3005	3032
JD 2444480.5	67	52	36	18	-4	-32	-66	-105	-148	-186	-211	-224	-229	-232	-237	-230	-226	-220	-215	-209	-202
1980 AUG 29.0	1700	1734	1774	1820	1875	1944	2029	2137	2268	2416	2563	2690	2781	2828	2821	2848	2879	2910	2939	2967	2993
JD 2444470.5	79	64	46	25	-0	-32	-71	-116	-159	-194	-215	-225	-230	-235	-241	-233	-229	-225	-220	-215	-209
1980 AUG 19.0	1673	1710	1754	1807	1871	1951	2051	2175	2318	2465	2599	2702	2765	2779	2740	2810	2841	2871	2900	2928	2954
JD 2444460.5	90	74	55	31	1	-36	-80	-128	-170	-200	-217	-225	-231	-237	-238	-235	-232	-229	-224	-220	-215
1980 AUG 9.0	1647	1689	1739	1800	1875	1968	2084	2221	2367	2506	2618	2695	2729	2712	2740	2772	2803	2833	2861	2889	2915
JD 2444450.5	100	83	61	34	-0	-43	-93	-141	-179	-204	-218	-226	-232	-236	-238	-237	-234	-231	-228	-224	-219
1980 JUL 30.0	1625	1672	1729	1800	1887	1995	2125	2269	2410	2532	2621	2671	2676	2631	2703	2735	2765	2794	2822	2849	2875
JD 2444440.5	109	90	66	34	-6	-55	-107	-152	-185	-206	-218	-225	-230	-238	-238	-237	-235	-233	-230	-227	-223
1980 JUL 20.0	1606	1660	1726	1807	1908	2031	2171	2314	2442	2542	2607	2631	2607	2634	2666	2697	2727	2756	2784	2810	2836

(FLT T)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M18 E12

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)
JD 2444560.5 1980 NOV 17.0	0	0	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169
JD 2444550.5 1980 NOV 7.0	0	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142
JD 2444540.5 1980 OCT 28.0	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113
JD 2444530.5 1980 OCT 18.0	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081
JD 2444520.5 1980 OCT 8.0	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046
JD 2444510.5 1980 SEP 28.0	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008
JD 2444500.5 1980 SEP 18.0	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	0	1966	1966	1966	1966
JD 2444490.5 1980 SEP 8.0	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921
JD 2444480.5 1980 AUG 29.0	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873
JD 2444470.5 1980 AUG 19.0	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820
JD 2444460.5 1980 AUG 9.0	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764
JD 2444450.5 1980 JUL 30.0	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703
JD 2444440.5 1980 JUL 20.0	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639

(FLT T)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)

JD2444600.5 1980 DEC 27.0 JD2444640.5 1981 FEB 5.0 JD2444680.5 1981 MAR 17.0 JD2444720.5 1981 APR 26.0 JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

M18
E12

(FLT T)	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240
JD 2444560.5	0	0	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
1980 NOV 17.0	0	0	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314
JD 2444550.5	0	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228
1980 NOV 7.0	0	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340
JD 2444540.5	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243
1980 OCT 28.0	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366
JD 2444530.5	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257
1980 OCT 18.0	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394
JD 2444520.5	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272
1980 OCT 8.0	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421
JD 2444510.5	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286
1980 SEP 28.0	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450
JD 2444500.5	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	0	300	300	300	300
1980 SEP 18.0	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	0	479	479	479	479
JD 2444490.5	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313
1980 SEP 8.0	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509
JD 2444480.5	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326
1980 AUG 29.0	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540
JD 2444470.5	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338
1980 AUG 19.0	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573
JD 2444460.5	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
1980 AUG 9.0	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606
JD 2444450.5	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359
1980 JUL 30.0	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641
JD 2444440.5	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368
1980 JUL 20.0	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678

(FLT T)	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M18 E12

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

	(FLT T)	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240
JD 2444560.5		0	0	1885	1986	2087	2188	2289	2389	2489	2588	2687	2785	2882	2979	3076	3172	3268	3363	3458	3552	52
1980 NOV 17.0		0	0	-986	-1042	-1099	-1156	-1214	-1272	-1330	-1389	-1448	-1508	-1569	-1631	-1693	-1755	1784	1736	1716	1756	1780
JD 2444550.5		0	1844	1944	2045	2146	2248	2348	2449	2548	2648	2746	2844	2942	3039	3135	3232	3327	3423	3517	20	110
1980 NOV 7.0		0	-968	-1024	-1081	-1138	-1196	-1254	-1313	-1372	-1432	-1492	-1553	-1614	-1677	-1739	1799	1746	1715	1732	1792	1758
JD 2444540.5		1786	1901	2002	2104	2205	2306	2407	2507	2607	2706	2805	2903	3000	3097	3194	3290	3386	3481	3574	74	169
1980 OCT 28.0		-944	-1005	-1062	-1120	-1178	-1236	-1295	-1355	-1415	-1475	-1536	-1598	-1660	-1723	-1784	1759	1719	1717	1774	1772	1735
JD 2444530.5		1857	1958	2060	2161	2263	2364	2465	2565	2665	2764	2863	2961	3058	3155	3252	3348	3444	3538	37	131	226
1980 OCT 18.0		-986	-1043	-1101	-1159	-1218	-1277	-1337	-1397	-1458	-1519	-1581	-1643	-1706	-1768	1774	1727	1710	1746	1786	1750	1713
JD 2444520.5		1913	2014	2116	2218	2319	2421	2521	2622	2721	2821	2919	3017	3115	3212	3309	3405	3500	3589	92	187	283
1980 OCT 8.0		-1024	-1081	-1140	-1199	-1258	-1318	-1379	-1440	-1501	-1564	-1626	-1689	-1751	1789	1739	1709	1723	1789	1765	1729	1692
JD 2444510.5		1968	2070	2172	2274	2375	2476	2577	2677	2777	2876	2975	3073	3171	3268	3364	3460	3556	53	148	243	338
1980 SEP 28.0		-1062	-1120	-1179	-1239	-1299	-1360	-1421	-1483	-1545	-1608	-1671	-1733	-1793	1752	1714	1709	1759	1780	1744	1708	1671
JD 2444500.5		2023	2125	2227	2328	2430	2531	2632	2732	2832	2931	3030	3128	3226	3323	3419	3515	0	107	203	298	393
1980 SEP 18.0		-1100	-1159	-1219	-1280	-1341	-1402	-1464	-1527	-1590	-1652	-1715	-1776	1767	1723	1703	1731	0	1760	1724	1687	1651
JD 2444490.5		2077	2179	2281	2382	2484	2585	2686	2786	2886	2985	3084	3182	3279	3377	3473	3569	66	161	256	352	447
1980 SEP 8.0		-1139	-1199	-1260	-1321	-1383	-1445	-1508	-1570	-1633	-1696	-1758	1784	1734	1704	1711	1771	1776	1740	1703	1667	1631
JD 2444480.5		2130	2232	2334	2435	2537	2638	2739	2839	2939	3038	3137	3235	3332	3430	3526	23	118	214	309	405	500
1980 AUG 29.0		-1179	-1239	-1301	-1363	-1425	-1488	-1551	-1614	-1677	-1739	-1798	1749	1710	1700	1738	1792	1756	1720	1684	1648	1612
JD 2444470.5		2182	2284	2386	2487	2589	2690	2791	2891	2991	3090	3189	3287	3385	3482	3578	74	170	266	361	457	552
1980 AUG 19.0		-1216	-1280	-1342	-1404	-1467	-1531	-1594	-1657	-1719	-1779	1765	1720	1697	1713	1780	1773	1737	1701	1665	1629	1593
JD 2444460.5		2233	2335	2437	2538	2640	2741	2842	2942	3042	3141	3240	3338	3436	3533	29	126	221	317	413	508	603
1980 AUG 9.0		-1259	-1321	-1383	-1447	-1510	-1573	-1637	-1699	-1760	1782	1733	1701	1698	1743	1789	1754	1718	1682	1646	1611	1576
JD 2444450.5		2283	2385	2487	2589	2690	2792	2892	2993	3092	3192	3290	3389	3486	3583	80	176	272	367	463	558	654
1980 JUL 30.0		-1300	-1362	-1425	-1489	-1552	-1616	-1679	-1740	-1798	1748	1709	1692	1715	1784	1771	1735	1700	1664	1628	1593	1558
JD 2444440.5		2333	2435	2537	2638	2740	2841	2942	3042	3142	3241	3340	3438	3536	33	129	226	321	417	512	608	703
1980 JUL 20.0		-1341	-1404	-1467	-1531	-1594	-1658	-1719	-1779	1765	1720	1692	1696	1745	1788	1753	1717	1682	1646	1611	1576	1541
	(FLT T)	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

M18
E12

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)
JD 2444560.5	0	0	1069	493	327	250	208	183	168	160	157	159	165	178	198	231	287	391	643	1908	1748
1980 NOV 17.0	0	0	1989	1569	1295	1106	970	869	793	736	694	664	644	635	638	655	693	760	867	978	998
JD 2444550.5	0	1959	589	352	257	207	179	161	151	147	146	151	160	176	201	243	319	480	1021	4607	765
1980 NOV 7.0	0	2065	1617	1326	1125	982	877	798	738	694	661	640	629	629	642	674	731	824	944	1000	992
JD 2444540.5	8040	767	387	264	206	173	153	142	135	134	136	142	154	174	205	260	366	650	3052	1044	461
1980 OCT 28.0	2171	1669	1359	1147	997	886	803	741	694	660	637	624	621	631	657	705	785	900	994	997	983
JD 2444530.5	1224	442	274	204	166	144	131	123	120	121	125	134	148	171	210	282	445	1126	1893	531	312
1980 OCT 18.0	1725	1395	1172	1013	896	809	744	695	659	634	619	614	620	641	682	751	855	969	999	990	971
JD 2444520.5	541	289	201	158	134	119	111	107	106	108	114	124	141	168	217	316	610	7091	659	329	223
1980 OCT 8.0	1435	1198	1030	908	817	748	696	658	631	614	607	611	628	661	720	811	929	999	995	980	956
JD 2444510.5	312	199	149	123	107	98	92	90	91	95	102	113	133	165	226	374	1174	983	354	219	162
1980 SEP 28.0	1226	1049	921	825	753	698	658	629	610	601	602	615	643	693	771	882	984	998	987	967	940
JD 2444500.5	196	139	110	93	84	78	75	75	76	81	89	101	122	160	240	505	0	400	215	150	117
1980 SEP 18.0	1070	935	834	758	701	658	627	607	595	594	604	627	668	736	835	949	0	993	977	953	922
JD 2444490.5	125	95	78	68	63	59	58	59	61	66	74	87	110	153	265	1077	510	210	134	101	83
1980 SEP 8.0	950	844	765	704	659	626	604	590	586	593	612	647	704	790	903	993	997	985	964	937	903
JD 2444480.5	77	61	52	47	43	42	42	43	46	50	58	70	93	142	324	1056	203	114	81	64	54
1980 AUG 29.0	855	771	708	661	625	601	585	579	583	598	627	675	750	854	963	1000	992	975	950	920	884
JD 2444470.5	41	34	29	27	26	25	25	27	29	32	38	48	69	123	660	194	86	56	43	35	31
1980 AUG 19.0	779	713	662	625	598	581	573	574	585	609	650	714	806	918	997	997	984	963	935	902	864
JD 2444460.5	13	11	10	9	9	9	9	10	11	12	15	20	31	74	170	40	23	17	13	11	10
1980 AUG 9.0	717	664	625	596	577	567	565	573	593	627	681	761	867	971	999	991	974	949	918	883	844
JD 2444450.5	10	9	8	8	8	8	8	9	10	12	15	21	38	257	54	25	17	13	10	9	8
1980 JUL 30.0	667	625	594	573	561	557	562	578	606	652	721	816	928	998	996	983	962	934	901	864	825
JD 2444440.5	29	26	24	24	24	24	26	28	33	40	54	84	210	411	105	61	44	35	30	27	25
1980 JUL 20.0	625	592	569	555	549	552	564	587	626	685	768	876	975	999	991	974	949	919	884	845	805

(FLT T)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E12

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

	(FLT T)(40)(50)(60)(70)(80)(90)(100)(110)(120)(130)(140)(150)(160)(170)(180)(190)(200)(210)(220)(230)(240)
JD 2444560.5	0 0 332 339 345 351 357 361 363 364 363 359 352 341 324 298 258 198 109 18 -1
1980 NOV 17.0	0 0-9999-9999-9999-9999-9999-5138-3150-2397-2008-1775-1626-1527-1464-1429 1423 1450 1520 1615 1907
JD 2444550.5	0 351 356 361 367 371 374 377 377 376 372 365 354 339 315 279 226 145 46 0 -6
1980 NOV 7.0	0-9999-9999-9999-9999-9999-5701-3345-2501-2075-1824-1663-1556-1486-1445 1432 1449 1506 1599 1911 1941
JD 2444540.5	378 374 378 383 386 389 391 391 389 385 379 368 353 332 299 251 180 83 5 -2 -16
1980 OCT 28.0	-9999-9999-9999-9999-9999-6428-3574-2620-2151-1877-1703-1588-1511-1464-1443 1452 1495 1580 1668 1947 1974
JD 2444530.5	394 397 399 402 404 405 405 403 399 392 383 368 348 319 276 212 122 26 -0 -9 -29
1980 OCT 18.0	-9999-9999-9999-9999-7390-3845-2756-2236-1937-1748-1622-1538-1485-1458 1458 1490 1561 1658 1952 1981 2005
JD 2444520.5	416 417 419 420 421 420 417 413 407 397 384 365 338 299 242 161 61 1 -4 -20 -45
1980 OCT 8.0	-9999-9999-9999-8706-4167-2910-2330-2002-1797-1660-1568-1508-1475 1467 1489 1546 1640 1717 1988 2014 2034
JD 2444510.5	436 437 437 437 435 433 428 422 412 399 381 356 321 271 198 101 14 -1 -12 -33 -63
1980 SEP 28.0	-9999-9999-9999-4553-3086-2435-2074-1850-1702-1601-1534-1494-1479 1491 1536 1619 1713 1993 2021 2044 2062
JD 2444500.5	456 455 454 452 449 444 437 428 415 398 375 343 298 233 144 44 0 -6 -23 -49 -84
1980 SEP 18.0	-9999-9999-5016-3287-2553-2153-1908-1746-1637-1562-1516-1493 1497 1530 1600 1697 0 2028 2053 2073 2088
JD 2444490.5	474 472 469 465 460 453 444 432 415 394 364 323 266 185 85 7 -2 -14 -37 -68 -106
1980 SEP 8.0	-9999-5578-3515-2682-2240-1971-1795-1675-1593-1540-1511 1507 1529 1585 1675 1764 2034 2062 2084 2101 2113
JD 2444480.5	491 487 483 477 470 461 449 433 413 385 348 297 225 130 33 0 -7 -26 -53 -88 -131
1980 AUG 29.0	-6265-3775-2826-2334-2039-1846-1716-1626-1566-1530-1518 1531 1574 1653 1751 2040 2069 2093 2112 2126 2136
JD 2444470.5	506 501 495 488 478 466 451 432 406 372 326 262 176 73 3 -2 -16 -39 -71 -110 -156
1980 AUG 19.0	-4069-2985-2437-2112-1902-1759-1661-1593-1551-1532 1537 1568 1633 1728 1813 2075 2102 2123 2139 2151 2158
JD 2444460.5	520 514 506 497 485 470 451 428 396 354 297 220 121 26 -0 -8 -27 -55 -91 -134 -183
1980 AUG 9.0	-3158-2547-2190-1961-1806-1698-1623-1575-1549 1546 1567 1618 1703 1801 2081 2109 2133 2151 2165 2174 2179
JD 2444450.5	533 525 515 504 489 471 449 420 381 330 261 170 67 2 -3 -17 -41 -73 -113 -159 -210
1980 JUL 30.0	-2665-2274-2024-1855-1737-1655-1600-1567-1556 1569 1608 1680 1778 1859 2116 2142 2163 2178 2189 2196 2199
JD 2444440.5	545 535 523 509 492 470 443 408 362 300 218 116 24 -0 -9 -28 -56 -93 -136 -185 -239
1980 JUL 20.0	-2361-2090-1906-1779-1689-1627-1588-1569 1574 1602 1660 1750 1848 2121 2149 2173 2190 2204 2212 2217 2217
	(FLT T)(160)(170)(180)(190)(200)(210)(220)(230)(240)(250)(260)(270)(280)(290)(300)(310)(320)(330)(340)(350)(360)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E12

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240
JD 2444560.5	0	0	192	216	238	258	277	295	313	330	348	366	384	405	429	458	501	579	779	1931	91
1980 NOV 17.0	0	0	99	113	127	141	154	166	179	191	203	215	226	238	249	260	271	281	291	298	146
JD 2444550.5	0	180	204	226	247	266	284	302	319	337	354	373	393	415	442	479	540	675	1191	90	92
1980 NOV 7.0	0	96	111	125	138	151	164	176	189	200	212	224	235	247	258	268	279	289	297	145	149
JD 2444540.5	165	193	215	235	255	273	291	308	326	343	362	381	402	427	460	510	606	891	3522	91	93
1980 OCT 28.0	93	108	122	135	149	161	174	186	198	210	221	233	244	255	266	277	287	295	302	149	153
JD 2444530.5	182	204	224	244	262	280	298	315	332	350	369	390	413	443	484	557	734	1575	91	93	95
1980 OCT 18.0	105	119	133	146	159	171	183	195	207	219	230	241	253	264	274	284	294	301	149	153	157
JD 2444520.5	193	213	233	251	269	287	304	321	339	357	377	399	426	462	520	640	1039	8435	92	94	96
1980 OCT 8.0	117	130	143	156	168	181	193	204	216	227	239	250	261	272	282	292	300	306	152	157	161
JD 2444510.5	203	222	241	258	276	293	310	328	346	365	386	411	443	490	576	804	2196	92	93	95	97
1980 SEP 28.0	127	140	153	165	178	190	202	213	225	236	247	258	269	279	289	298	305	152	156	161	165
JD 2444500.5	211	230	248	265	282	299	317	334	353	373	396	425	464	530	675	1218	0	93	94	96	99
1980 SEP 18.0	137	150	163	175	187	199	210	222	233	244	255	266	277	287	296	304	0	156	160	164	169
JD 2444490.5	219	237	254	271	288	305	323	341	361	382	408	442	494	595	876	3181	92	94	96	98	100
1980 SEP 8.0	147	159	172	184	196	207	219	230	241	252	263	274	284	294	302	309	155	159	164	168	173
JD 2444480.5	227	244	261	278	294	312	329	348	369	393	423	466	539	708	1407	92	93	95	97	99	102
1980 AUG 29.0	156	169	181	192	204	216	227	238	249	260	271	281	291	300	308	155	159	163	168	172	177
JD 2444470.5	233	250	267	283	300	318	336	356	378	405	441	498	610	941	4615	93	94	96	98	101	103
1980 AUG 19.0	165	177	189	201	212	224	235	246	257	268	278	288	298	306	312	158	162	167	171	176	181
JD 2444460.5	240	256	273	289	306	324	343	364	389	420	465	545	734	1569	92	94	95	97	100	102	105
1980 AUG 9.0	174	186	198	209	221	232	243	254	265	275	285	295	304	311	158	162	166	170	175	180	185
JD 2444450.5	246	262	278	295	312	331	350	373	401	438	498	619	986	6133	93	95	96	99	101	104	107
1980 JUL 30.0	183	194	206	217	228	240	251	261	272	282	292	302	310	315	161	165	170	174	179	184	190
JD 2444440.5	251	268	284	301	318	337	359	383	416	463	546	748	1664	93	94	96	98	100	102	105	108
1980 JUL 20.0	191	202	214	225	236	247	258	269	279	289	299	308	314	161	165	169	173	178	183	188	194

(FLT T)	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

M18
E12

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)
JD 2444560.5 1980 NOV 17.0	0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444550.5 1980 NOV 7.0	0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444540.5 1980 OCT 28.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444530.5 1980 OCT 18.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444520.5 1980 OCT 8.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444510.5 1980 SEP 28.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444500.5 1980 SEP 18.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	0	1524	1524	1524	1524
JD 2444490.5 1980 SEP 8.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444480.5 1980 AUG 29.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444470.5 1980 AUG 19.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444460.5 1980 AUG 9.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444450.5 1980 JUL 30.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444440.5 1980 JUL 20.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524

(FLT T)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)

JD2444600.5 1980 DEC 27.0 JD2444640.5 1981 FEB 5.0 JD2444680.5 1981 MAR 17.0 JD2444720.5 1981 APR 26.0 JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

M18
E12

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)
JD 2444560.5	0	0	4541	3586	2889	2357	1943	1614	1351	1140	973	843	747	686	661	686	781	995	1418	2132	2595
1980 NOV 17.0	0	0	5446	4434	3674	3081	2604	2212	1885	1610	1379	1187	1034	923	864	873	977	1217	1652	2317	2848
JD 2444550.5	0	4595	3585	2889	2360	1947	1619	1356	1146	978	846	748	682	650	662	735	905	1244	1849	2683	2481
1980 NOV 7.0	0	5478	4429	3670	3078	2602	2209	1882	1607	1375	1182	1026	909	841	836	915	1110	1471	2052	2897	2750
JD 2444540.5	5730	3584	2888	2362	1951	1624	1362	1152	983	850	749	680	642	644	697	832	1103	1602	2362	2572	2371
1980 OCT 28.0	6156	4429	3669	3077	2602	2210	1883	1607	1374	1178	1019	898	822	803	860	1017	1316	1811	2495	2798	2655
JD 2444530.5	3599	2885	2362	1953	1629	1368	1157	988	854	752	679	636	629	667	773	989	1393	2058	2666	2463	2263
1980 OCT 18.0	4442	3669	3079	2603	2212	1885	1609	1375	1178	1015	890	806	774	811	937	1184	1599	2214	2844	2702	2561
JD 2444520.5	2879	2359	1954	1632	1372	1162	994	859	755	679	632	617	642	725	898	1222	1781	2555	2559	2357	2159
1980 OCT 8.0	3671	3082	2607	2217	1890	1613	1378	1179	1014	884	793	750	768	866	1069	1415	1948	2622	2746	2607	2469
JD 2444510.5	2353	1951	1632	1375	1166	998	863	758	680	629	607	622	685	823	1083	1541	2239	2659	2455	2254	2057
1980 SEP 28.0	3066	2613	2224	1897	1620	1384	1183	1015	881	782	728	731	805	970	1257	1710	2332	2789	2651	2514	2380
JD 2444500.5	1945	1630	1375	1168	1001	866	760	680	626	599	604	652	762	970	1340	1939	0	2557	2354	2154	1958
1980 SEP 18.0	2619	2232	1906	1629	1392	1190	1019	880	776	711	699	750	883	1121	1501	2052	0	2694	2558	2424	2293
JD 2444490.5	1624	1372	1168	1002	867	761	680	623	592	589	624	711	878	1175	1673	2383	2662	2457	2255	2056	1863
1980 SEP 8.0	2240	1915	1639	1402	1198	1026	883	772	699	672	703	808	1004	1321	1794	2408	2736	2601	2467	2337	2209
JD 2444480.5	1366	1164	1000	867	760	678	619	584	575	599	667	802	1041	1446	2068	2770	2564	2359	2158	1962	1770
1980 AUG 29.0	1926	1650	1413	1209	1034	888	771	689	650	663	742	902	1165	1565	2119	2778	2643	2510	2380	2252	2127
JD 2444470.5	1157	995	864	758	675	615	577	563	577	630	738	930	1258	1781	2491	2674	2468	2265	2065	1870	1680
1980 AUG 19.0	1662	1426	1221	1045	895	774	684	633	629	685	813	1031	1367	1848	2445	2685	2553	2423	2295	2170	2048
JD 2444460.5	987	858	753	671	609	569	550	557	598	684	839	1103	1533	2166	2787	2580	2374	2172	1974	1781	1593
1980 AUG 9.0	1438	1234	1057	905	780	683	621	602	637	736	916	1196	1606	2152	2728	2596	2466	2338	2212	2090	1972
JD 2444450.5	848	745	663	601	559	537	538	568	637	762	975	1325	1863	2566	2694	2487	2283	2082	1885	1694	1509
1980 JUL 30.0	1248	1070	917	788	685	613	580	596	671	816	1049	1394	1875	2452	2640	2510	2381	2255	2133	2013	1898
JD 2444440.5	734	653	592	548	523	519	541	595	697	870	1152	1598	2232	2812	2604	2397	2194	1994	1799	1610	1428
1980 JUL 20.0	1084	930	798	690	610	565	563	615	730	922	1211	1623	2158	2684	2554	2426	2300	2176	2056	1939	1827

(FLT T)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE — EARTH - MARS TRAJECTORY PARAMETERS — M18 E12

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)
JD 2444560.5	0	0	9987	8020	6563	5438	4547	3825	3236	2750	2352	2031	1781	1609	1525	1559	1758	2212	3069	4449	5443
1980 NOV 17.0	0	0	1885	1986	2087	2188	2289	2389	2489	2588	2687	2785	2882	2979	3076	3172	3268	3363	3458	3552	52
JD 2444550.5	0	9999	8014	6560	5438	4549	3829	3239	2753	2353	2028	1773	1591	1492	1498	1649	2014	2715	3902	5581	5231
1980 NOV 7.0	0	1844	1944	2045	2146	2248	2348	2449	2548	2648	2746	2844	2942	3039	3135	3232	3327	3423	3517	20	110
JD 2444540.5	9999	8013	6557	5440	4553	3834	3245	2759	2357	2028	1769	1578	1464	1447	1557	1849	2419	3413	4857	5370	5025
1980 OCT 28.0	1786	1901	2002	2104	2205	2306	2407	2507	2607	2706	2805	2903	3000	3097	3194	3290	3386	3481	3574	74	169
JD 2444530.5	8041	6554	5441	4557	3841	3253	2766	2363	2032	1767	1569	1442	1403	1478	1710	2173	2992	4272	5510	5165	4824
1980 OCT 18.0	1857	1958	2060	2161	2263	2364	2465	2565	2665	2764	2863	2961	3058	3155	3252	3348	3444	3538	37	131	226
JD 2444520.5	6550	5441	4561	3849	3262	2776	2372	2038	1769	1563	1425	1366	1411	1591	1967	2638	3729	5176	5305	4964	4628
1980 OCT 8.0	1913	2014	2116	2218	2319	2421	2521	2622	2721	2821	2919	3017	3115	3212	3309	3405	3500	3589	92	187	283
JD 2444510.5	5438	4564	3856	3272	2787	2382	2046	1773	1560	1411	1336	1353	1490	1793	2341	3250	4571	5448	5106	4768	4437
1980 SEP 28.0	1968	2070	2172	2274	2375	2476	2577	2677	2777	2876	2975	3073	3171	3268	3364	3460	3556	53	148	243	338
JD 2444500.5	4564	3862	3281	2797	2393	2056	1779	1560	1401	1310	1303	1402	1645	2092	2841	3991	0	5250	4911	4578	4252
1980 SEP 18.0	2023	2125	2227	2328	2430	2531	2632	2732	2832	2931	3030	3128	3226	3323	3419	3515	0	107	203	298	393
JD 2444490.5	3864	3288	2807	2403	2066	1786	1562	1395	1290	1261	1327	1518	1882	2496	3467	4791	5398	5058	4722	4393	4072
1980 SEP 8.0	2077	2179	2281	2382	2484	2585	2686	2786	2886	2985	3084	3182	3279	3377	3473	3569	66	161	256	352	447
JD 2444480.5	3291	2815	2413	2076	1794	1566	1391	1274	1225	1262	1409	1703	2206	3011	4187	5548	5207	4870	4538	4213	3897
1980 AUG 29.0	2130	2232	2334	2435	2537	2638	2739	2839	2939	3038	3137	3235	3332	3430	3526	23	118	214	309	405	500
JD 2444470.5	2819	2421	2084	1803	1571	1389	1261	1195	1207	1315	1551	1962	2625	3630	4936	5359	5021	4687	4359	4039	3728
1980 AUG 19.0	2182	2284	2386	2487	2589	2690	2791	2891	2991	3090	3189	3287	3385	3482	3578	74	170	266	361	457	552
JD 2444460.5	2426	2092	1810	1576	1389	1251	1171	1159	1234	1420	1755	2299	3139	4318	5515	5176	4840	4510	4186	3871	3565
1980 AUG 9.0	2233	2335	2437	2538	2640	2741	2842	2942	3042	3141	3240	3338	3436	3533	29	126	221	317	413	508	603
JD 2444450.5	2096	1815	1580	1389	1244	1150	1119	1164	1308	[illegible]	2024	2719	3738	5018	5334	4997	4664	4337	4018	3708	3407
1980 JUL 30.0	2283	2385	2487	2589	2690	2792	2892	2993	3092	3192	3290	3389	3486	3583	80	176	272	367	463	558	654
JD 2444440.5	1818	1583	1390	1238	1134	1084	1104	1210	1427	1791	2363	3221	4390	5496	5158	4823	4493	4170	3855	3550	3255
1980 JUL 20.0	2333	2435	2537	2638	2740	2841	2942	3042	3142	3241	3340	3438	3536	33	129	226	321	417	512	608	703
(FLT T)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)

JD2444600.5 1980 DEC 27.0 — JD2444640.5 1981 FEB 5.0 — JD2444680.5 1981 MAR 17.0 — JD2444720.5 1981 APR 26.0 — JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

M18
E13

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444720.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671702	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.619	DEGREES
MEAN ANOM. AT EPOCH	=	111.296	DEGREES
DATE OF NODAL PASSAGE	=	2444870.619	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444720.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338821	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.413	DEGREES
ARG. OF PERIHELION	=	286.302	DEGREES
MEAN ANOM. AT EPOCH	=	43.206	DEGREES
DATE OF NODAL PASSAGE	=	2444759.490	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.066	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E13

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)
JD 2444560.5	1332	1262	1192	1124	1057	991	927	865	805	746	690	635	583	534	487	443	407	421	596	306	255
1980 NOV 17.0	1053	1003	953	904	857	810	765	722	681	641	603	568	534	503	474	448	427	431	553	379	355
JD 2444550.5	1292	1222	1153	1086	1019	955	891	830	771	713	658	605	554	506	460	420	395	942	340	270	232
1980 NOV 7.0	1020	971	922	875	829	784	740	699	659	621	585	551	519	490	463	439	423	766	403	368	351
JD 2444540.5	1254	1184	1116	1049	983	919	857	796	738	682	627	576	526	479	435	399	427	428	288	245	211
1980 OCT 28.0	987	939	892	846	801	758	716	676	638	601	567	535	505	477	452	430	440	457	382	362	348
JD 2444530.5	1216	1147	1079	1012	947	884	823	763	706	651	598	547	499	453	411	386	1413	311	259	223	193
1980 OCT 18.0	956	909	863	818	775	733	692	654	617	582	549	519	490	464	441	425	1119	397	372	358	346
JD 2444520.5	1179	1110	1043	977	913	851	790	732	675	621	569	520	472	428	390	425	356	275	236	204	177
1980 OCT 8.0	924	879	834	790	748	708	669	632	597	564	533	504	477	452	431	443	423	383	366	354	345
JD 2444510.5	1143	1075	1008	943	880	818	759	701	646	593	542	493	447	404	374	719	293	250	216	187	164
1980 SEP 28.0	894	849	806	764	723	684	646	611	577	546	516	489	464	441	423	638	394	375	362	352	345
JD 2444500.5	1108	1041	974	910	847	787	728	672	617	565	515	467	422	382	406	319	265	229	198	173	154
1980 SEP 18.0	864	821	779	738	698	661	625	591	559	528	500	475	451	430	435	407	382	368	358	350	345
JD 2444490.5	1074	1007	942	878	816	756	699	643	589	538	489	443	399	363	435	281	243	210	183	161	149
1980 SEP 8.0	836	793	752	713	674	638	604	571	540	512	485	461	439	420	468	390	375	363	355	349	346
JD 2444480.5	1041	975	910	847	786	727	670	615	563	513	464	419	376	367	300	258	224	194	170	154	149
1980 AUG 29.0	808	766	727	688	651	616	583	552	523	496	471	448	427	418	398	381	368	359	352	348	347
JD 2444470.5	1009	943	879	817	757	699	643	589	537	488	441	396	354	331	275	239	207	180	161	151	153
1980 AUG 19.0	781	741	702	665	629	596	564	534	506	481	457	435	416	412	386	373	363	355	350	348	349
JD 2444460.5	978	913	849	788	728	671	616	563	512	464	418	373	333	292	255	222	192	169	155	152	163
1980 AUG 9.0	755	715	678	642	608	576	545	517	490	466	444	424	405	391	377	366	358	352	348	348	352
JD 2444450.5	948	883	820	760	701	645	591	538	489	441	396	352	313	273	238	206	180	161	153	158	177
1980 JUL 30.0	729	691	655	620	587	556	527	500	475	452	431	413	395	382	370	360	353	349	348	350	356
JD 2444440.5	918	854	792	733	675	619	566	515	466	419	375	345	294	256	222	193	170	157	156	169	196
1980 JUL 20.0	705	668	633	599	568	538	510	484	461	439	420	411	386	373	363	355	349	347	347	351	360

(FLT T)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E13

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

	(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)
JD 2444560.5		98	74	50	25	-0	-25	-50	-74	-98	-119	-138	-153	-164	-170	-166	-148	-94	100	-753	-485	-402
1980 NOV 17.0		1587	1646	1705	1765	1825	1886	1949	2012	2077	2143	2211	2281	2352	2424	2496	2568	2640	2729	3437	2855	2881
JD 2444550.5		105	82	58	33	7	-17	-43	-67	-90	-112	-131	-146	-157	-161	-155	-126	-28	442	-552	-420	-377
1980 NOV 7.0		1566	1626	1686	1746	1807	1868	1930	1994	2058	2125	2192	2261	2332	2403	2475	2547	2625	3018	2763	2784	2816
JD 2444540.5		113	89	65	40	15	-10	-35	-60	-84	-105	-124	-140	-150	-152	-140	-90	132	-694	-440	-381	-359
1980 OCT 28.0		1545	1606	1667	1727	1788	1850	1912	1976	2040	2106	2173	2242	2311	2382	2453	2528	2641	2724	2683	2723	2747
JD 2444530.5		120	97	72	47	22	-3	-28	-53	-77	-98	-117	-133	-142	-141	-119	-24	-525	-475	-382	-354	-343
1980 OCT 18.0		1525	1587	1648	1709	1770	1832	1895	1958	2022	2088	2154	2222	2291	2361	2433	2517	102	2579	2627	2660	2670
JD 2444520.5		126	103	79	54	29	3	-21	-46	-70	-92	-111	-125	-133	-128	-88	153	-558	-384	-344	-330	-324
1980 OCT 8.0		1506	1568	1630	1691	1753	1815	1877	1940	2004	2069	2135	2202	2270	2339	2414	2551	2469	2531	2572	2591	2583
JD 2444510.5		132	110	86	61	36	10	-15	-40	-63	-85	-104	-118	-124	-112	-81	-844	-390	-332	-314	-306	-300
1980 SEP 28.0		1487	1550	1612	1674	1735	1797	1860	1922	1986	2050	2115	2181	2248	2318	2403	3278	2433	2484	2512	2514	2486
JD 2444500.5		138	116	92	68	42	16	-8	-33	-57	-79	-97	-111	-114	-89	146	-423	-316	-294	-285	-279	-269
1980 SEP 18.0		1468	1531	1594	1656	1718	1780	1842	1905	1968	2031	2095	2160	2226	2298	2445	2329	2398	2433	2446	2429	2380
JD 2444490.5		143	121	98	74	48	23	-2	-27	-51	-73	-91	-104	-103	-49	-638	-301	-270	-261	-255	-245	-228
1980 SEP 8.0		1450	1514	1577	1639	1701	1763	1825	1887	1949	2012	2075	2138	2203	2283	2175	2312	2356	2377	2372	2336	2269
JD 2444480.5		148	127	104	79	54	29	3	-21	-45	-67	-86	-98	-92	83	-292	-241	-233	-228	-220	-204	-179
1980 AUG 29.0		1432	1496	1559	1622	1684	1746	1807	1869	1930	1992	2053	2115	2180	2307	2225	2281	2309	2314	2291	2237	2159
JD 2444470.5		153	132	109	85	60	34	9	-16	-40	-62	-82	-94	-79	-349	-208	-200	-198	-193	-180	-156	-126
1980 AUG 19.0		1415	1479	1543	1605	1667	1729	1790	1851	1911	1971	2031	2090	2155	2117	2208	2243	2256	2245	2204	2134	2054
JD 2444460.5		157	136	114	90	65	39	14	-11	-36	-59	-80	-95	-64	-163	-162	-165	-163	-153	-133	-104	-74
1980 AUG 9.0		1397	1462	1526	1589	1650	1712	1772	1832	1891	1949	2006	2062	2129	2141	2179	2199	2198	2169	2111	2034	1959
JD 2444450.5		161	141	118	95	70	44	18	-7	-32	-57	-82	-112	-54	-113	-126	-130	-125	-109	-83	-52	-26
1980 JUL 30.0		1380	1445	1509	1572	1634	1694	1754	1813	1871	1926	1979	2025	2100	2119	2142	2149	2132	2087	2017	1939	1875
JD 2444440.5		165	145	123	99	74	48	22	-4	-31	-59	-95	-241	-36	-80	-93	-94	-84	-62	-32	-3	14
1980 JUL 20.0		1364	1429	1493	1555	1617	1677	1736	1793	1849	1901	1946	1945	2071	2088	2100	2094	2061	2001	1924	1852	1802
	(FLT T)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E13

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

	(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)
JD 2444560.5		-119	-108	-97	-86	-76	-66	-56	-47	-39	-32	-26	-20	-17	-16	-19	-29	-58	-178	337	156	111
1980 NOV 17.0		3294	3322	3349	3375	3399	3423	3445	3466	3487	3506	3525	3542	3560	3577	3594	13	38	87	3330	3563	3599
JD 2444550.5		-132	-121	-111	-100	-90	-81	-72	-63	-56	-49	-43	-38	-35	-35	-41	-57	-112	-537	167	97	74
1980 NOV 7.0		3259	3286	3312	3338	3362	3384	3406	3427	3447	3466	3484	3501	3518	3535	3552	3573	6	3586	3486	3542	3562
JD 2444540.5		-144	-134	-124	-114	-105	-96	-87	-79	-72	-65	-60	-56	-54	-55	-64	-91	-231	221	87	56	43
1980 OCT 28.0		3222	3249	3275	3300	3323	3346	3367	3387	3407	3425	3443	3460	3476	3493	3511	3536	3592	3365	3482	3508	3522
JD 2444530.5		-156	-146	-137	-128	-119	-110	-102	-94	-87	-81	-76	-72	-71	-75	-89	-143	196	86	39	23	15
1980 OCT 18.0		3185	3212	3237	3262	3285	3307	3328	3348	3367	3385	3402	3418	3435	3452	3471	3504	2924	3418	3454	3470	3480
JD 2444520.5		-167	-158	-149	-140	-132	-124	-116	-109	-102	-96	-92	-89	-89	-95	-119	-271	113	24	4	-4	-9
1980 OCT 8.0		3147	3174	3199	3223	3246	3268	3288	3308	3326	3344	3360	3377	3393	3410	3433	3494	3335	3400	3419	3430	3437
JD 2444510.5		-177	-169	-160	-152	-144	-136	-129	-122	-116	-110	-106	-104	-105	-116	-163	261	15	-14	-24	-29	-33
1980 SEP 28.0		3109	3136	3160	3184	3207	3228	3248	3267	3285	3302	3319	3335	3351	3369	3399	3066	3343	3367	3379	3387	3393
JD 2444500.5		-186	-179	-171	-163	-156	-148	-141	-135	-129	-124	-120	-119	-122	-139	-286	21	-32	-45	-49	-52	-55
1980 SEP 18.0		3071	3097	3122	3145	3167	3188	3208	3227	3244	3261	3277	3293	3309	3329	3387	3278	3316	3329	3338	3344	3349
JD 2444490.5		-195	-188	-181	-174	-166	-160	-153	-147	-141	-136	-133	-132	-137	-170	126	-48	-65	-70	-72	-73	-75
1980 SEP 8.0		3032	3058	3082	3105	3127	3148	3167	3186	3203	3219	3235	3250	3266	3291	3147	3264	3280	3289	3296	3300	3303
JD 2444480.5		-202	-196	-189	-183	-176	-170	-163	-157	-152	-147	-144	-143	-152	-256	-58	-85	-90	-92	-92	-93	-94
1980 AUG 29.0		2993	3019	3043	3065	3087	3107	3127	3145	3162	3177	3192	3207	3224	3269	3210	3230	3240	3247	3252	3255	3257
JD 2444470.5		-209	-203	-197	-191	-185	-179	-172	-167	-161	-157	-153	-153	-165	-32	-106	-111	-111	-111	-111	-111	-112
1980 AUG 19.0		2954	2979	3003	3025	3047	3067	3086	3103	3120	3135	3150	3164	3181	3140	3181	3192	3199	3204	3208	3210	3211
JD 2444460.5		-215	-209	-204	-198	-192	-186	-180	-175	-169	-164	-160	-158	-179	-131	-133	-132	-130	-129	-128	-128	-129
1980 AUG 9.0		2915	2939	2963	2985	3006	3026	3044	3062	3078	3092	3106	3119	3138	3133	3143	3150	3156	3160	3162	3163	3163
JD 2444450.5		-219	-214	-209	-204	-198	-193	-187	-181	-175	-169	-163	-152	-188	-159	-153	-149	-146	-144	-143	-143	-144
1980 JUL 30.0		2875	2900	2923	2945	2965	2985	3003	3020	3035	3049	3062	3072	3094	3095	3102	3108	3112	3115	3116	3116	3115
JD 2444440.5		-223	-219	-214	-209	-204	-198	-192	-186	-179	-171	-159	-88	-199	-177	-169	-164	-160	-158	-157	-157	-158
1980 JUL 20.0		2836	2860	2883	2904	2925	2944	2961	2978	2993	3006	3016	3006	3050	3054	3059	3064	3067	3069	3070	3068	3065
	(FLT T)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E13

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

	(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)
JD 2444560.5 1980 NOV 17.0		2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169
JD 2444550.5 1980 NOV 7.0		2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142
JD 2444540.5 1980 OCT 28.0		2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113
JD 2444530.5 1980 OCT 18.0		2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081
JD 2444520.5 1980 OCT 8.0		2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046
JD 2444510.5 1980 SEP 28.0		2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008
JD 2444500.5 1980 SEP 18.0		1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966
JD 2444490.5 1980 SEP 8.0		1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921
JD 2444480.5 1980 AUG 29.0		1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873
JD 2444470.5 1980 AUG 19.0		1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820
JD 2444460.5 1980 AUG 9.0		1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764
JD 2444450.5 1980 JUL 30.0		1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	1703
JD 2444440.5 1980 JUL 20.0		1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639

(FLT T)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E13

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)
JD 2444560.5	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
1980 NOV 17.0	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314
JD 2444550.5	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228
1980 NOV 7.0	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340
JD 2444540.5	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243
1980 OCT 28.0	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366
JD 2444530.5	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257
1980 OCT 18.0	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394
JD 2444520.5	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272
1980 OCT 8.0	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421
JD 2444510.5	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286	286
1980 SEP 28.0	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450
JD 2444500.5	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
1980 SEP 18.0	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479
JD 2444490.5	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313	313
1980 SEP 8.0	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509	509
JD 2444480.5	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326
1980 AUG 29.0	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540
JD 2444470.5	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338
1980 AUG 19.0	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573
JD 2444460.5	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349
1980 AUG 9.0	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606
JD 2444450.5	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359	359
1980 JUL 30.0	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641
JD 2444440.5	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368
1980 JUL 20.0	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678

(FLT T)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E13

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)
JD 2444560.5	52	146	241	337	433	530	627	724	823	921	1021	1120	1221	1321	1423	1524	1625	1726	1834	1933	2034
1980 NOV 17.0	1780	1743	1706	1669	1631	1594	1556	1520	1483	1447	1412	1378	1345	1313	1282	1253	1225	1200	1175	1154	1135
JD 2444550.5	110	205	301	397	493	589	686	784	882	981	1080	1180	1280	1381	1482	1583	1685	1781	1891	1992	2093
1980 NOV 7.0	1758	1721	1683	1646	1609	1571	1535	1498	1463	1427	1393	1360	1328	1297	1267	1239	1213	1190	1166	1147	1129
JD 2444540.5	169	264	359	455	551	648	745	843	941	1039	1139	1238	1339	1439	1541	1642	1743	1848	1949	2050	2152
1980 OCT 28.0	1735	1698	1661	1624	1587	1550	1514	1478	1443	1409	1375	1343	1312	1282	1254	1227	1202	1179	1159	1141	1126
JD 2444530.5	226	321	417	513	609	706	803	900	998	1097	1196	1296	1396	1497	1598	1699	1812	1904	2006	2108	2209
1980 OCT 18.0	1713	1676	1639	1602	1566	1530	1494	1459	1424	1391	1358	1327	1297	1268	1241	1216	1192	1172	1154	1138	1124
JD 2444520.5	283	378	474	569	666	762	859	957	1055	1154	1253	1353	1453	1554	1655	1756	1860	1961	2063	2164	2266
1980 OCT 8.0	1692	1655	1618	1582	1546	1510	1475	1440	1407	1374	1343	1312	1283	1256	1231	1207	1185	1166	1150	1136	1125
JD 2444510.5	338	434	529	625	721	818	915	1013	1111	1210	1309	1409	1509	1610	1711	1816	1915	2017	2118	2220	2322
1980 SEP 28.0	1671	1634	1598	1562	1526	1491	1457	1423	1390	1358	1328	1299	1271	1245	1221	1199	1179	1162	1147	1135	1126
JD 2444500.5	393	489	584	680	776	873	970	1068	1166	1264	1364	1464	1564	1665	1765	1868	1969	2071	2173	2275	2377
1980 SEP 18.0	1651	1614	1578	1543	1508	1473	1439	1406	1374	1344	1314	1286	1260	1235	1213	1193	1175	1159	1146	1136	1129
JD 2444490.5	447	542	638	734	830	927	1024	1121	1220	1318	1418	1517	1618	1718	1821	1922	2023	2125	2227	2329	2430
1980 SEP 8.0	1631	1595	1559	1524	1490	1456	1423	1391	1360	1330	1302	1275	1250	1227	1206	1187	1171	1157	1147	1139	1134
JD 2444480.5	500	595	691	787	883	980	1077	1174	1273	1371	1471	1570	1671	1771	1873	1974	2076	2178	2280	2382	2483
1980 AUG 29.0	1612	1576	1541	1507	1473	1439	1407	1376	1346	1317	1290	1265	1241	1220	1200	1183	1169	1157	1148	1142	1139
JD 2444470.5	552	647	743	839	935	1032	1129	1227	1325	1423	1523	1623	1723	1824	1925	2026	2128	2230	2332	2434	2536
1980 AUG 19.0	1593	1558	1524	1489	1456	1424	1392	1362	1333	1305	1279	1255	1233	1213	1195	1180	1167	1157	1150	1146	1145
JD 2444460.5	603	699	794	890	986	1083	1180	1278	1376	1475	1574	1674	1774	1875	1976	2078	2179	2281	2383	2485	2587
1980 AUG 9.0	1576	1541	1507	1473	1440	1409	1378	1349	1321	1294	1270	1247	1226	1207	1191	1178	1167	1158	1153	1151	1152
JD 2444450.5	654	749	845	941	1037	1133	1230	1328	1426	1525	1624	1724	1824	1925	2026	2128	2230	2332	2434	2535	2637
1980 JUL 30.0	1558	1524	1490	1457	1425	1394	1365	1336	1309	1284	1260	1239	1220	1202	1188	1176	1167	1160	1157	1156	1159
JD 2444440.5	703	799	894	990	1086	1183	1280	1378	1476	1574	1674	1774	1874	1975	2076	2178	2279	2381	2483	2585	2687
1980 JUL 20.0	1541	1508	1474	1442	1411	1381	1352	1324	1298	1274	1252	1232	1214	1198	1185	1175	1167	1163	1161	1162	1167

(FLT T)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)

JD2444800.5	JD2444840.5	JD2444880.5	JD2444920.5	JD2444960.5
1981 JUL 15.0	1981 AUG 24.0	1981 OCT 3.0	1981 NOV 12.0	1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

M18
E13

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

	(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)
JD 2444560.5		1748	623	384	283	229	197	177	165	158	157	160	169	185	212	256	339	524	1233	2772	686	396
1980 NOV 17.0		998	987	966	937	903	864	822	778	733	689	646	604	564	526	491	459	430	403	378	358	340
JD 2444550.5		765	416	291	229	193	170	157	149	146	147	153	165	185	219	277	396	732	4936	931	445	298
1980 NOV 7.0		992	975	949	917	880	839	796	752	708	665	622	582	544	508	474	444	417	394	369	350	334
JD 2444540.5		461	301	228	187	163	148	139	134	134	138	146	161	185	227	305	491	1348	1618	522	316	232
1980 OCT 28.0		983	961	931	896	857	815	772	728	684	641	600	561	525	490	459	430	405	381	361	344	330
JD 2444530.5		312	226	180	154	137	127	122	120	122	128	138	156	185	238	348	689	8106	663	341	235	183
1980 OCT 18.0		971	944	911	874	833	791	747	704	661	619	579	542	507	474	445	418	391	373	354	339	327
JD 2444520.5		223	172	143	126	115	109	106	106	110	117	129	150	185	253	422	1377	1022	381	239	178	145
1980 OCT 8.0		956	926	890	851	810	767	723	680	638	598	560	524	490	460	432	407	384	365	349	336	325
JD 2444510.5		162	131	113	102	95	91	90	92	97	105	119	143	186	277	582	3546	454	245	171	135	114
1980 SEP 28.0		940	907	869	829	786	743	700	658	617	578	541	507	475	446	420	396	376	359	345	333	325
JD 2444500.5		117	99	87	80	76	74	75	78	83	92	108	134	186	318	1234	630	255	163	123	101	88
1980 SEP 18.0		922	886	847	806	763	720	678	637	597	559	524	491	461	434	410	388	370	354	342	332	326
JD 2444490.5		83	72	65	61	59	58	60	63	69	78	94	123	186	410	1632	276	153	108	86	73	65
1980 SEP 8.0		903	866	826	784	741	698	657	617	578	542	508	477	449	423	400	381	364	350	340	333	329
JD 2444480.5		54	48	45	43	42	42	44	47	52	61	77	107	186	836	329	139	90	68	56	49	45
1980 AUG 29.0		884	845	804	762	719	677	637	597	560	526	493	464	437	414	393	375	360	348	339	334	333
JD 2444470.5		31	28	26	25	25	26	27	30	34	41	54	83	187	607	116	65	46	37	31	28	26
1980 AUG 19.0		864	824	783	740	698	657	617	580	544	511	480	452	427	405	386	370	357	347	340	338	339
JD 2444460.5		10	9	9	9	9	9	10	11	13	16	23	40	192	67	29	19	14	12	10	9	9
1980 AUG 9.0		844	804	762	720	678	638	599	563	528	497	468	441	418	398	380	366	354	347	342	342	346
JD 2444450.5		8	8	8	8	8	8	9	10	12	16	25	57	177	35	20	14	11	9	8	8	8
1980 JUL 30.0		825	783	742	700	659	620	582	547	514	484	456	432	410	391	375	363	354	348	346	348	355
JD 2444440.5		25	24	24	24	25	27	30	35	44	61	107	509	182	78	51	38	32	28	25	24	24
1980 JUL 20.0		805	764	722	681	641	603	566	532	501	472	446	423	403	386	372	361	354	350	351	356	366
	(FLT T)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)

JD2444800.5
1981 JUL 15.0

JD2444840.5
1981 AUG 24.0

JD2444880.5
1981 OCT 3.0

JD2444920.5
1981 NOV 12.0

JD2444960.5
1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E13

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

	(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)
JD 2444560.5		-1	-12	-33	-63	-101	-145	-195	-250	-307	-367	-428	-489	-549	-607	-663	-715	-764	-808	-851	-886	-917
1980 NOV 17.0		1907	1935	1959	1977	1991	2000	2005	2007	2005	2000	1992	1983	1972	1959	1945	1931	1917	1903	1886	1875	1863
JD 2444550.5		-6	-24	-51	-86	-127	-175	-228	-285	-344	-404	-465	-525	-584	-641	-695	-745	-791	-831	-872	-905	-933
1980 NOV 7.0		1941	1967	1987	2002	2013	2020	2022	2022	2018	2011	2002	1992	1980	1966	1952	1938	1923	1912	1895	1882	1871
JD 2444540.5		-16	-39	-71	-110	-156	-207	-262	-320	-380	-441	-502	-561	-619	-674	-725	-773	-817	-858	-892	-922	-947
1980 OCT 28.0		1974	1996	2013	2026	2034	2038	2039	2036	2030	2022	2012	2000	1987	1973	1959	1944	1931	1915	1903	1891	1881
JD 2444530.5		-29	-57	-94	-137	-186	-239	-296	-356	-416	-477	-537	-596	-652	-705	-755	-800	-846	-878	-910	-937	-958
1980 OCT 18.0		2005	2024	2038	2048	2054	2055	2054	2049	2042	2033	2021	2009	1995	1981	1966	1952	1933	1924	1911	1901	1892
JD 2444520.5		-45	-78	-118	-165	-217	-273	-331	-391	-452	-513	-572	-629	-684	-735	-782	-825	-864	-898	-926	-950	-968
1980 OCT 8.0		2034	2050	2062	2069	2072	2072	2068	2062	2053	2043	2031	2017	2003	1988	1974	1960	1945	1932	1921	1912	1904
JD 2444510.5		-63	-101	-145	-195	-249	-306	-366	-427	-488	-548	-606	-662	-714	-763	-808	-850	-884	-915	-941	-961	-976
1980 SEP 28.0		2062	2075	2084	2089	2090	2087	2082	2074	2064	2053	2040	2026	2011	1996	1982	1966	1954	1942	1932	1924	1918
JD 2444500.5		-84	-125	-173	-225	-282	-341	-401	-462	-523	-582	-639	-693	-743	-790	-832	-870	-903	-931	-953	-970	-981
1980 SEP 18.0		2088	2099	2105	2107	2106	2102	2095	2086	2075	2062	2049	2034	2019	2005	1991	1976	1964	1953	1944	1937	1934
JD 2444490.5		-106	-151	-202	-257	-315	-375	-436	-496	-556	-614	-670	-722	-771	-815	-855	-890	-920	-944	-963	-977	-984
1980 SEP 8.0		2113	2121	2125	2125	2122	2116	2108	2097	2085	2072	2058	2043	2028	2013	1999	1986	1974	1965	1957	1952	1951
JD 2444480.5		-131	-179	-232	-289	-348	-409	-470	-530	-589	-646	-700	-750	-796	-838	-875	-907	-934	-956	-971	-981	985
1980 AUG 29.0		2136	2142	2143	2142	2137	2129	2120	2108	2095	2081	2067	2052	2037	2023	2009	1997	1986	1977	1972	1969	1970
JD 2444470.5		-156	-207	-262	-321	-381	-442	-503	-563	-621	-676	-728	-777	-821	-860	-894	-923	-947	-965	-977	-983	983
1980 AUG 19.0		2158	2161	2161	2158	2151	2142	2131	2119	2105	2091	2076	2061	2046	2032	2019	2008	1998	1991	1987	1987	1991
JD 2444460.5		-183	-236	-293	-353	-414	-475	-536	-595	-652	-705	-755	-801	-843	-880	-911	-937	-958	-972	-981	984	978
1980 AUG 9.0		2179	2180	2178	2173	2165	2155	2143	2130	2115	2100	2085	2070	2056	2043	2030	2020	2012	2007	2005	2007	2015
JD 2444450.5		-210	-266	-325	-385	-446	-507	-567	-626	-681	-733	-781	-825	-864	-898	-926	-949	-967	-978	-982	981	970
1980 JUL 30.0		2199	2198	2194	2187	2178	2167	2154	2140	2125	2110	2095	2080	2066	2053	2042	2033	2026	2023	2023	2029	2040
JD 2444440.5		-239	-296	-356	-417	-478	-539	-598	-655	-709	-759	-805	-846	-883	-914	-940	-960	-974	-981	983	976	960
1980 JUL 20.0		2217	2215	2209	2201	2190	2178	2165	2150	2135	2120	2105	2090	2077	2065	2055	2047	2042	2041	2044	2052	2065

	(FLT T)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

M18
E13

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)
JD 2444560.5	91	92	95	97	100	103	106	110	114	119	123	128	134	139	145	151	158	164	172	179	186
1980 NOV 17.0	146	150	155	160	165	170	176	182	188	195	201	208	216	223	231	239	247	255	264	273	281
JD 2444550.5	92	94	96	99	102	105	109	112	117	121	126	131	137	142	148	155	161	168	175	183	190
1980 NOV 7.0	149	154	159	164	169	175	181	187	193	200	207	214	221	229	237	245	253	261	270	279	287
JD 2444540.5	93	95	98	101	104	107	111	115	119	124	129	134	140	146	152	158	165	172	179	187	194
1980 OCT 28.0	153	158	163	168	174	179	185	191	198	205	212	219	227	234	242	250	259	267	276	285	294
JD 2444530.5	95	97	99	102	106	109	113	117	122	127	132	137	143	149	155	162	169	176	183	191	199
1980 OCT 18.0	157	162	167	172	178	184	190	196	203	210	217	224	232	240	248	256	265	273	282	291	300
JD 2444520.5	96	98	101	104	108	111	115	120	124	129	134	140	146	152	159	165	172	180	187	195	203
1980 OCT 8.0	161	166	171	177	182	188	195	201	208	215	222	230	237	245	253	262	270	279	288	297	306
JD 2444510.5	97	100	103	106	110	113	118	122	127	132	137	143	149	155	162	169	176	183	191	199	207
1980 SEP 28.0	165	170	176	181	187	193	199	206	213	220	227	235	243	251	259	268	276	285	294	303	312
JD 2444500.5	99	102	105	108	112	116	120	124	129	135	140	146	152	159	165	172	180	187	195	203	211
1980 SEP 18.0	169	174	180	185	191	198	204	211	218	225	232	240	248	256	264	273	282	290	299	308	317
JD 2444490.5	100	103	106	110	114	118	122	127	132	137	143	149	155	162	169	176	183	191	199	207	216
1980 SEP 8.0	173	179	184	190	196	202	209	216	223	230	238	245	253	262	270	279	287	296	305	314	323
JD 2444480.5	102	105	108	112	116	120	124	129	135	140	146	152	158	165	172	179	187	195	203	211	220
1980 AUG 29.0	177	183	188	194	200	207	213	220	228	235	243	251	259	267	276	284	293	302	311	320	329
JD 2444470.5	103	107	110	114	118	122	127	132	137	143	149	155	161	168	175	183	190	198	207	215	224
1980 AUG 19.0	181	187	193	199	205	211	218	225	233	240	248	256	264	272	281	290	299	307	317	326	335
JD 2444460.5	105	108	112	116	120	124	129	134	140	146	152	158	165	171	179	186	194	202	211	219	229
1980 AUG 9.0	185	191	197	203	209	216	223	230	237	245	253	261	269	278	286	295	304	313	322	331	340
JD 2444450.5	107	110	114	118	122	127	132	137	142	148	154	161	168	175	182	190	198	206	215	224	233
1980 JUL 30.0	190	195	201	207	214	221	228	235	242	250	258	266	275	283	292	301	310	319	328	337	346
JD 2444440.5	108	112	116	120	124	129	134	139	145	151	157	164	171	178	185	193	201	210	219	228	238
1980 JUL 20.0	194	199	206	212	218	225	232	240	247	255	263	271	280	288	297	306	315	324	333	342	352

(FLT T)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M18 E13

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)
JD 2444560.5 1980 NOV 17.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1435	1344	
JD 2444550.5 1980 NOV 7.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1500	1370	1305	
JD 2444540.5 1980 OCT 28.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1402	1327	1274	
JD 2444530.5 1980 OCT 18.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1445	1350	1292	1248	
JD 2444520.5 1980 OCT 8.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1378	1312	1264	1227	
JD 2444510.5 1980 SEP 28.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1411	1335	1281	1240	1211	
JD 2444500.5 1980 SEP 18.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1460	1360	1301	1256	1222	1200	
JD 2444490.5 1980 SEP 8.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1389	1324	1273	1235	1208	1194	
JD 2444480.5 1980 AUG 29.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1423	1349	1294	1250	1219	1199	1194
JD 2444470.5 1980 AUG 19.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1484	1378	1317	1269	1232	1207	1196	1199
JD 2444460.5 1980 AUG 9.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1488	1409	1344	1290	1248	1218	1201	1197	1210
JD 2444450.5 1980 JUL 30.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1449	1375	1315	1267	1231	1208	1199	1205	1228
JD 2444440.5 1980 JUL 20.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1512	1413	1345	1290	1248	1219	1203	1202	1218	1253

(FLT T)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

M18
E13

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)
JD 2444560.5	2595	2394	2196	2003	1814	1630	1452	1281	1116	959	810	669	537	414	301	200	119	149	569	0	0
1980 NOV 17.0	2848	2699	2553	2410	2270	2135	2003	1877	1756	1641	1532	1429	1333	1244	1163	1089	1029	1041	1387	896	828
JD 2444550.5	2481	2282	2086	1895	1708	1528	1353	1186	1025	872	728	592	464	347	239	146	92	1494	0	0	0
1980 NOV 7.0	2750	2605	2463	2324	2188	2057	1930	1809	1693	1583	1479	1381	1290	1206	1130	1063	1019	2006	962	865	818
JD 2444540.5	2371	2173	1979	1790	1606	1429	1258	1094	938	789	649	517	395	283	182	100	162	166	0	0	0
1980 OCT 28.0	2655	2513	2375	2239	2108	1981	1859	1742	1631	1526	1427	1335	1249	1170	1098	1039	1067	1114	903	848	811
JD 2444530.5	2263	2067	1875	1689	1508	1333	1166	1006	853	709	574	447	329	222	128	72	2828	0	0	0	0
1980 OCT 18.0	2561	2423	2288	2157	2030	1907	1790	1678	1571	1471	1377	1289	1208	1134	1069	1024	3042	946	877	836	806
JD 2444520.5	2159	1964	1775	1591	1413	1242	1078	921	773	633	502	380	267	165	81	158	10	0	0	0	0
1980 OCT 8.0	2469	2335	2204	2076	1954	1835	1722	1615	1513	1418	1329	1246	1170	1100	1041	1073	1019	906	861	828	803
JD 2444510.5	2057	1864	1677	1496	1321	1153	993	840	696	560	433	316	208	112	48	888	0	0	0	0	0
1980 SEP 28.0	2380	2249	2122	1998	1879	1766	1657	1554	1457	1366	1282	1204	1132	1068	1019	1633	936	883	848	821	802
JD 2444500.5	1958	1768	1583	1404	1233	1068	911	763	622	491	368	255	153	64	116	0	0	0	0	0	0
1980 SEP 18.0	2293	2166	2042	1922	1808	1698	1594	1496	1403	1317	1237	1163	1096	1037	1050	975	905	866	837	816	803
JD 2444490.5	1863	1674	1492	1316	1148	987	833	689	552	425	307	198	100	24	181	0	0	0	0	0	0
1980 SEP 8.0	2209	2085	1965	1849	1738	1633	1533	1439	1351	1270	1194	1125	1062	1009	1145	926	884	852	828	812	805
JD 2444480.5	1770	1584	1404	1231	1066	908	759	618	486	362	249	144	52	32	0	0	0	0	0	0	0
1980 AUG 29.0	2127	2006	1890	1778	1671	1570	1475	1385	1301	1224	1153	1088	1029	1003	948	900	866	840	821	810	808
JD 2444470.5	1680	1496	1319	1150	988	833	688	551	422	303	194	94	6	0	0	0	0	0	0	0	0
1980 AUG 19.0	2048	1931	1818	1710	1607	1510	1418	1333	1254	1181	1114	1053	998	988	915	879	850	829	816	810	814
JD 2444460.5	1593	1412	1238	1071	912	762	620	486	362	247	142	46	0	0	0	0	0	0	0	0	0
1980 AUG 9.0	1972	1858	1748	1644	1545	1452	1365	1283	1208	1139	1076	1020	969	929	891	860	837	820	811	811	821
JD 2444450.5	1509	1331	1159	996	840	693	555	426	305	195	94	3	0	0	0	0	0	0	0	0	0
1980 JUL 30.0	1898	1787	1682	1581	1486	1397	1313	1236	1165	1100	1042	990	941	903	870	844	824	813	809	815	831
JD 2444440.5	1428	1252	1084	923	771	628	493	368	252	145	49	0	0	0	0	0	0	0	0	0	0
1980 JUL 20.0	1827	1720	1617	1520	1429	1344	1264	1191	1124	1063	1010	984	914	879	851	829	814	807	808	820	843

(FLT T)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E13

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)
JD 2444560.5	5443	5093	4749	4413	4084	3765	3455	3158	2872	2600	2342	2098	1870	1658	1463	1289	1147	1190	1955	896	828
1980 NOV 17.0	52	146	241	337	433	530	627	724	823	921	1021	1120	1221	1321	1423	1524	1625	1726	1834	1933	2034
JD 2444550.5	5231	4887	4549	4219	3897	3585	3284	2994	2718	2455	2206	1973	1755	1553	1369	1209	1110	3500	962	865	818
1980 NOV 7.0	110	205	301	397	493	589	686	784	882	981	1080	1180	1280	1381	1482	1583	1685	1781	1891	1992	2093
JD 2444540.5	5025	4686	4354	4029	3715	3410	3117	2836	2569	2315	2076	1852	1644	1452	1280	1139	1229	1280	903	848	811
1980 OCT 28.0	169	264	359	455	551	648	745	843	941	1039	1139	1238	1339	1439	1541	1642	1743	1848	1949	2050	2152
JD 2444530.5	4824	4490	4163	3846	3538	3241	2956	2684	2425	2180	1951	1736	1538	1357	1197	1096	5870	946	877	836	806
1980 OCT 18.0	226	321	417	513	609	706	803	900	998	1097	1196	1296	1396	1497	1598	1699	1812	1904	2006	2108	2209
JD 2444520.5	4628	4299	3978	3667	3366	3077	2800	2536	2286	2051	1830	1625	1437	1266	1122	1231	1028	906	861	828	803
1980 OCT 8.0	283	378	474	569	666	762	859	957	1055	1154	1253	1353	1453	1554	1655	1756	1860	1961	2063	2164	2266
JD 2444510.5	4437	4113	3799	3494	3200	2919	2650	2394	2153	1927	1715	1520	1340	1180	1068	2522	936	883	848	821	802
1980 SEP 28.0	338	434	529	625	721	818	915	1013	1111	1210	1309	1409	1509	1610	1711	1816	1915	2017	2118	2220	2322
JD 2444500.5	4252	3933	3625	3327	3040	2766	2505	2258	2026	1808	1605	1419	1249	1101	1166	975	905	866	837	816	803
1980 SEP 18.0	393	489	584	680	776	873	970	1068	1166	1264	1364	1464	1564	1665	1765	1868	1969	2071	2173	2275	2377
JD 2444490.5	4072	3759	3457	3165	2886	2619	2367	2128	1904	1695	1501	1323	1162	1033	1326	926	884	852	828	812	805
1980 SEP 8.0	447	542	638	734	830	927	1024	1121	1220	1318	1418	1517	1618	1718	1821	1922	2023	2125	2227	2329	2430
JD 2444480.5	3897	3590	3294	3009	2737	2478	2234	2003	1787	1587	1401	1232	1081	1036	948	900	866	840	821	810	808
1980 AUG 29.0	500	595	691	787	883	980	1077	1174	1273	1371	1471	1570	1671	1771	1873	1974	2076	2178	2280	2382	2483
JD 2444470.5	3728	3427	3137	2859	2595	2343	2106	1884	1676	1484	1307	1147	1004	988	915	879	850	829	816	810	814
1980 AUG 19.0	552	647	743	839	935	1032	1129	1227	1325	1423	1523	1623	1723	1824	1925	2026	2128	2230	2332	2434	2536
JD 2444460.5	3565	3270	2986	2715	2458	2214	1984	1770	1570	1387	1218	1066	969	929	891	860	837	820	811	811	821
1980 AUG 9.0	603	699	794	890	986	1083	1180	1278	1376	1475	1574	1674	1774	1875	1976	2078	2179	2281	2383	2485	2587
JD 2444450.5	3407	3118	2841	2577	2326	2090	1868	1662	1470	1295	1135	993	941	903	870	844	824	813	809	815	831
1980 JUL 30.0	654	749	845	941	1037	1133	1230	1328	1426	1525	1624	1724	1824	1925	2026	2128	2230	2332	2434	2535	2637
JD 2444440.5	3255	2972	2701	2444	2201	1972	1758	1559	1376	1209	1059	984	914	879	851	829	814	807	808	820	843
1980 JUL 20.0	703	799	894	990	1086	1183	1280	1378	1476	1574	1674	1774	1874	1975	2076	2178	2279	2381	2483	2585	2687

(FLT T)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

M18
E14

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444820.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671690	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.624	DEGREES
MEAN ANOM. AT EPOCH	=	209.856	DEGREES
DATE OF NODAL PASSAGE	=	2444870.615	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444820.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338847	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.415	DEGREES
ARG. OF PERIHELION	=	286.305	DEGREES
MEAN ANOM. AT EPOCH	=	95.608	DEGREES
DATE OF NODAL PASSAGE	=	2444759.487	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.068	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E14

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)
JD 2444560.5	255	219	190	166	149	141	144	160	188	228	281	351	448	585	792	1104	1495	1455	1401	1347	1292
1980 NOV 17.0	355	339	328	319	314	312	313	319	330	348	374	414	475	569	718	950	1244	1227	1189	1150	1111
JD 2444550.5	232	200	174	154	143	142	155	179	215	264	329	415	536	714	982	1350	1477	1423	1369	1314	1259
1980 NOV 7.0	351	338	329	323	320	320	324	333	348	372	407	459	538	663	859	1133	1238	1200	1162	1123	1084
JD 2444540.5	211	183	161	146	142	150	171	204	249	308	386	493	647	876	1206	0	1446	1391	1336	1281	1225
1980 OCT 28.0	348	338	331	327	326	329	336	349	369	400	445	513	617	780	1023	0	1211	1173	1135	1097	1058
JD 2444530.5	193	168	151	143	147	164	194	235	289	360	455	589	785	1072	1438	1470	1415	1359	1304	1248	1192
1980 OCT 18.0	346	338	333	331	333	339	350	367	394	433	491	579	715	922	1189	1220	1183	1146	1108	1070	1032
JD 2444520.5	177	157	145	145	158	184	222	271	336	422	539	707	954	1291	1494	1439	1384	1328	1272	1215	1159
1980 OCT 8.0	345	339	337	337	341	350	366	388	422	472	546	660	834	1077	1229	1192	1155	1118	1080	1043	1005
JD 2444510.5	164	149	145	154	175	209	255	314	392	495	641	851	1150	0	1465	1409	1353	1296	1240	1183	1127
1980 SEP 28.0	345	341	340	343	351	364	383	413	455	518	613	758	970	0	1201	1164	1127	1090	1053	1016	979
JD 2444500.5	154	146	150	168	198	239	294	364	456	583	763	1021	1357	1491	1435	1379	1322	1265	1208	1152	1095
1980 SEP 18.0	345	343	345	351	361	378	404	440	494	574	694	874	1111	1208	1173	1136	1100	1063	1026	989	953
JD 2444490.5	149	149	162	187	225	275	338	421	533	687	908	1211	0	1463	1406	1349	1292	1234	1177	1120	0
1980 SEP 8.0	346	346	350	359	374	395	427	473	540	640	790	1001	0	1181	1145	1109	1072	1036	999	963	0
JD 2444480.5	149	157	178	211	257	315	390	488	622	811	1075	1404	1491	1434	1377	1319	1261	1204	1147	0	0
1980 AUG 29.0	347	350	357	369	387	415	454	511	595	719	900	1128	1188	1153	1117	1081	1045	1009	973	0	0
JD 2444470.5	153	170	199	240	293	361	448	565	727	954	1256	0	1463	1405	1348	1290	1232	1174	0	0	0
1980 AUG 19.0	349	354	364	380	403	437	485	556	659	811	1017	0	1161	1125	1090	1054	1018	982	0	0	0
JD 2444460.5	163	187	224	272	334	412	515	655	849	1115	1435	1493	1435	1377	1319	1260	1202	0	0	0	0
1980 AUG 9.0	352	360	373	393	422	463	522	608	734	912	1130	1168	1133	1098	1063	1027	991	0	0	0	0
JD 2444450.5	177	209	253	308	379	471	592	758	988	1285	0	1465	1407	1349	1290	1232	0	0	0	0	0
1980 JUL 30.0	356	366	383	408	443	493	565	669	820	1019	0	1141	1106	1071	1036	1000	0	0	0	0	0
JD 2444440.5	196	235	285	349	431	537	680	877	1141	1452	1497	1439	1380	1321	1262	0	0	0	0	0	0
1980 JUL 20.0	360	374	395	424	467	527	614	740	914	1122	1149	1115	1080	1045	1010	0	0	0	0	0	0

(FLT T)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E14

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)
JD 2444560.5	-402	-370	-358	-358	-363	-366	-359	-340	-320	-304	-294	-287	-283	-279	-275	-266	-248	101	74	46	18
1980 NOV 17.0	2881	2906	2915	2897	2844	2756	2655	2569	2517	2495	2495	2509	2527	2541	2538	2505	2437	1573	1641	1708	1774
JD 2444550.5	-377	-360	-356	-358	-359	-351	-331	-309	-291	-280	-273	-269	-267	-264	-257	-241	131	106	79	52	24
1980 NOV 7.0	2816	2832	2824	2782	2705	2605	2514	2453	2425	2420	2431	2449	2466	2472	2453	2400	1490	1559	1626	1693	1760
JD 2444540.5	-359	-351	-350	-349	-339	-319	-295	-275	-262	-255	-252	-251	-249	-244	-232	0	136	111	85	58	30
1980 OCT 28.0	2747	2740	2718	2651	2558	2464	2395	2359	2348	2356	2373	2392	2404	2398	2360	0	1475	1544	1612	1679	1746
JD 2444530.5	-343	-339	-335	-325	-305	-279	-256	-242	-234	-231	-231	-231	-229	-220	-201	163	141	116	90	63	36
1980 OCT 18.0	2670	2651	2597	2512	2417	2342	2297	2281	2284	2299	2319	2335	2338	2316	2264	1390	1460	1529	1597	1665	1731
JD 2444520.5	-324	-319	-309	-288	-261	-236	-219	-210	-209	-208	-210	-210	-204	-190	187	167	145	121	96	69	41
1980 OCT 8.0	2583	2542	2467	2375	2294	2241	2218	2216	2228	2247	2266	2277	2267	2229	1302	1375	1446	1515	1583	1650	1717
JD 2444510.5	-300	-290	-269	-241	-214	-195	-185	-182	-183	-186	-188	-185	-175	0	190	171	149	126	101	74	47
1980 SEP 28.0	2486	2424	2337	2252	2191	2159	2152	2160	2178	2198	2213	2215	2191	0	1287	1360	1431	1501	1569	1636	1703
JD 2444500.5	-269	-249	-221	-192	-170	-158	-154	-155	-159	-163	-164	-158	-143	209	193	175	154	131	106	80	52
1980 SEP 18.0	2380	2302	2216	2147	2107	2092	2096	2111	2131	2150	2159	2148	2112	1198	1273	1345	1417	1486	1555	1622	1688
JD 2444490.5	-228	-200	-170	-145	-130	-125	-126	-130	-136	-139	-138	-127	0	211	196	178	158	135	110	85	0
1980 SEP 8.0	2269	2185	2110	2060	2037	2035	2047	2066	2087	2101	2101	2077	0	1183	1258	1331	1402	1472	1540	1608	0
JD 2444480.5	-179	-147	-120	-103	-96	-96	-101	-107	-113	-115	-109	-95	224	213	199	181	161	139	115	0	0
1980 AUG 29.0	2159	2079	2020	1987	1978	1986	2003	2024	2042	2050	2039	2006	1092	1168	1243	1316	1388	1458	1526	0	0
JD 2444470.5	-126	-96	-76	-66	-65	-70	-77	-84	-89	-88	-79	0	225	215	201	184	165	143	0	0	0
1980 AUG 19.0	2054	1986	1943	1926	1928	1942	1962	1983	1997	1996	1974	0	1077	1154	1229	1302	1374	1444	0	0	0
JD 2444460.5	-74	-50	-38	-35	-39	-46	-55	-62	-65	-60	-47	232	226	217	203	187	168	0	0	0	0
1980 AUG 9.0	1959	1906	1879	1874	1883	1902	1923	1941	1949	1938	1908	985	1063	1139	1214	1288	1359	0	0	0	0
JD 2444450.5	-26	-10	-5	-8	-15	-24	-33	-39	-39	-31	0	233	227	218	206	190	0	0	0	0	0
1980 JUL 30.0	1875	1837	1823	1827	1843	1864	1884	1898	1898	1878	0	971	1048	1125	1200	1273	0	0	0	0	0
JD 2444440.5	14	22	22	15	6	-3	-12	-16	-12	-2	233	233	228	219	207	0	0	0	0	0	0
1980 JUL 20.0	1802	1778	1775	1786	1805	1827	1845	1853	1844	1817	878	956	1034	1110	1186	0	0	0	0	0	0

(FLT T)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

M18
E14

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

	(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)
JD 2444560.5		111	93	82	74	68	62	55	48	41	32	23	12	-1	-18	-43	-80	-127	-83	-75	-66	-58
1980 NOV 17.0		3599	17	28	36	43	47	51	54	55	55	52	46	34	13	3572	3497	3382	3394	3413	3432	3450
JD 2444550.5		74	63	55	49	44	38	31	25	17	8	-2	-14	-30	-52	-84	-128	-107	-99	-91	-83	-76
1980 NOV 7.0		3562	3575	3584	3590	3595	3599	1	3	2	0	3595	3585	3567	3534	3474	3373	3334	3352	3371	3390	3408
JD 2444540.5		43	36	30	25	20	14	8	1	-6	-16	-28	-42	-62	-90	-128	0	-123	-115	-108	-100	-92
1980 OCT 28.0		3522	3532	3538	3544	3547	3550	3551	3551	3549	3545	3536	3521	3494	3445	3361	0	3292	3311	3329	3348	3366
JD 2444530.5		15	10	6	1	-3	-8	-14	-22	-31	-41	-55	-72	-96	-130	-171	-145	-138	-130	-123	-115	-108
1980 OCT 18.0		3480	3487	3493	3497	3499	3501	3501	3499	3495	3488	3475	3452	3412	3343	3234	3230	3249	3269	3288	3306	3325
JD 2444520.5		-9	-13	-17	-21	-25	-31	-38	-46	-55	-67	-83	-103	-132	-170	-165	-159	-152	-145	-137	-130	-123
1980 OCT 8.0		3437	3443	3447	3450	3451	3451	3449	3446	3439	3428	3409	3376	3319	3226	3168	3188	3207	3227	3246	3265	3283
JD 2444510.5		-33	-36	-39	-43	-48	-53	-60	-69	-80	-93	-111	-135	-168	0	-177	-171	-164	-158	-151	-144	-137
1980 SEP 28.0		3393	3397	3400	3402	3402	3400	3397	3391	3381	3365	3337	3291	3213	0	3125	3145	3165	3185	3204	3223	3242
JD 2444500.5		-55	-57	-60	-64	-69	-75	-83	-92	-104	-119	-140	-168	-201	-194	-188	-182	-176	-170	-164	-157	-151
1980 SEP 18.0		3349	3352	3353	3353	3352	3349	3343	3334	3320	3297	3259	3194	3094	3062	3083	3103	3123	3143	3162	3181	3200
JD 2444490.5		-75	-77	-80	-84	-89	-96	-104	-114	-128	-145	-168	-197	0	-204	-198	-193	-187	-181	-175	-169	0
1980 SEP 8.0		3303	3305	3305	3304	3301	3296	3288	3275	3255	3223	3171	3086	0	3019	3040	3061	3081	3101	3120	3140	0
JD 2444480.5		-94	-96	-99	-104	-109	-116	-125	-136	-151	-170	-195	-222	-216	-212	-207	-202	-197	-191	-185	0	0
1980 AUG 29.0		3257	3258	3257	3254	3249	3242	3230	3213	3186	3142	3072	2968	2955	2976	2997	3018	3039	3059	3079	0	0
JD 2444470.5		-112	-114	-117	-122	-127	-135	-144	-157	-173	-193	-217	0	-223	-219	-214	-210	-205	-200	0	0	0
1980 AUG 19.0		3211	3210	3207	3203	3196	3186	3170	3147	3111	3053	2963	0	2912	2934	2955	2976	2997	3017	0	0	0
JD 2444460.5		-129	-131	-134	-139	-145	-153	-163	-176	-193	-213	-232	-231	-228	-225	-221	-217	-212	0	0	0	0
1980 AUG 9.0		3163	3161	3157	3150	3141	3127	3107	3076	3028	2953	2848	2847	2869	2891	2913	2934	2955	0	0	0	0
JD 2444450.5		-144	-146	-149	-154	-161	-169	-179	-193	-210	-227	0	-235	-232	-229	-226	-222	0	0	0	0	0
1980 JUL 30.0		3115	3111	3105	3097	3084	3066	3040	3000	2938	2846	0	2805	2827	2849	2871	2892	0	0	0	0	0
JD 2444440.5		-158	-160	-163	-168	-175	-183	-194	-208	-223	-234	-239	-237	-235	-233	-230	0	0	0	0	0	0
1980 JUL 20.0		3065	3060	3052	3041	3025	3002	2968	2917	2840	2734	2740	2762	2785	2807	2828	0	0	0	0	0	0
	(FLT T)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E14

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

	(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)
JD 2444560.5 1980 NOV 17.0		2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169
JD 2444550.5 1980 NOV 7.0		2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142	2142
JD 2444540.5 1980 OCT 28.0		2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	2113	0	2113	2113	2113	2113	2113	
JD 2444530.5 1980 OCT 18.0		2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081	2081
JD 2444520.5 1980 OCT 8.0		2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046	2046
JD 2444510.5 1980 SEP 28.0		2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	2008	0	2008	2008	2008	2008	2008	2008	2008
JD 2444500.5 1980 SEP 18.0		1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966	1966
JD 2444490.5 1980 SEP 8.0		1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	1921	0	1921	1921	1921	1921	1921	1921	1921	0
JD 2444480.5 1980 AUG 29.0		1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	1873	0	0
JD 2444470.5 1980 AUG 19.0		1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	1820	0	1820	1820	1820	1820	1820	1820	0	0	0
JD 2444460.5 1980 AUG 9.0		1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	1764	0	0	0	0
JD 2444450.5 1980 JUL 30.0		1703	1703	1703	1703	1703	1703	1703	1703	1703	1703	0	1703	1703	1703	1703	1703	0	0	0	0	0
JD 2444440.5 1980 JUL 20.0		1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	1639	0	0	0	0	0	0

	(FLT T)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)

JD2445000.5
1982 JAN 31.0

JD2445040.5
1982 MAR 12.0

JD2445080.5
1982 APR 21.0

JD2445120.5
1982 MAY 31.0

JD2445160.5
1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E14

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)
JD 2444560.5	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
1980 NOV 17.0	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314
JD 2444550.5	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228
1980 NOV 7.0	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340	340
JD 2444540.5	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	0	243	243	243	243	243
1980 OCT 28.0	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366	0	366	366	366	366	366
JD 2444530.5	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257	257
1980 OCT 18.0	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394
JD 2444520.5	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272
1980 OCT 8.0	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421	421
JD 2444510.5	286	286	286	286	286	286	286	286	286	286	286	286	286	0	286	286	286	286	286	286	286
1980 SEP 28.0	450	450	450	450	450	450	450	450	450	450	450	450	450	0	450	450	450	450	450	450	450
JD 2444500.5	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
1980 SEP 18.0	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479
JD 2444490.5	313	313	313	313	313	313	313	313	313	313	313	313	0	313	313	313	313	313	313	313	0
1980 SEP 8.0	509	509	509	509	509	509	509	509	509	509	509	509	0	509	509	509	509	509	509	509	0
JD 2444480.5	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	0	0
1980 AUG 29.0	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	0	0
JD 2444470.5	338	338	338	338	338	338	338	338	338	338	338	0	338	338	338	338	338	338	0	0	0
1980 AUG 19.0	573	573	573	573	573	573	573	573	573	573	573	0	573	573	573	573	573	573	0	0	0
JD 2444460.5	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	349	0	0	0	0
1980 AUG 9.0	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	606	0	0	0	0
JD 2444450.5	359	359	359	359	359	359	359	359	359	359	0	359	359	359	359	359	0	0	0	0	0
1980 JUL 30.0	641	641	641	641	641	641	641	641	641	641	0	641	641	641	641	641	0	0	0	0	0
JD 2444440.5	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	0	0	0	0	0	0
1980 JUL 20.0	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	0	0	0	0	0	0

(FLT T)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E14

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

	(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)
JD 2444560.5		2034	2135	2236	2337	2437	2536	2635	2733	2831	2928	3025	3122	3218	3313	3408	3503	3584	96	191	287	383
1980 NOV 17.0		1135	1118	1104	1093	1086	1081	1080	1083	1091	1103	1122	1150	1192	1257	1363	1538	1754	1758	1718	1676	1635
JD 2444550.5		2093	2194	2295	2396	2496	2595	2694	2793	2891	2988	3085	3181	3277	3373	3468	3561	61	155	251	346	442
1980 NOV 7.0		1129	1115	1103	1094	1089	1087	1089	1095	1105	1122	1146	1182	1237	1324	1469	1690	1774	1733	1692	1651	1610
JD 2444540.5		2152	2253	2354	2455	2555	2654	2753	2851	2949	3047	3143	3240	3336	3431	3526	0	119	214	309	405	501
1980 OCT 28.0		1126	1113	1104	1098	1095	1095	1100	1108	1122	1143	1174	1221	1294	1412	1602	0	1749	1709	1668	1627	1586
JD 2444530.5		2209	2311	2412	2512	2612	2712	2811	2909	3007	3104	3201	3297	3393	3489	3581	81	176	271	367	462	558
1980 OCT 18.0		1124	1114	1107	1103	1102	1105	1112	1124	1142	1169	1209	1270	1367	1525	1747	1765	1725	1684	1644	1603	1563
JD 2444520.5		2266	2367	2468	2569	2669	2769	2867	2966	3064	3161	3258	3354	3450	3545	43	137	233	328	423	519	615
1980 OCT 8.0		1125	1116	1111	1110	1111	1117	1127	1143	1166	1199	1250	1330	1460	1658	1782	1742	1701	1661	1620	1580	1540
JD 2444510.5		2322	2423	2524	2625	2725	2824	2923	3022	3120	3217	3314	3410	3506	0	98	193	288	384	479	575	671
1980 SEP 28.0		1126	1120	1117	1118	1122	1130	1144	1163	1192	1235	1301	1407	1573	0	1759	1718	1678	1638	1598	1557	1518
JD 2444500.5		2377	2478	2579	2680	2780	2879	2978	3077	3174	3272	3368	3465	3560	57	152	248	343	438	534	630	726
1980 SEP 18.0		1129	1126	1125	1128	1134	1145	1162	1187	1223	1278	1364	1500	1702	1776	1736	1696	1655	1615	1575	1536	1496
JD 2444490.5		2430	2532	2633	2733	2834	2933	3032	3130	3228	3326	3422	3519	0	111	206	302	397	492	588	684	0
1980 SEP 8.0		1134	1132	1133	1138	1148	1162	1183	1214	1259	1330	1441	1611	0	1754	1713	1673	1633	1594	1554	1515	0
JD 2444480.5		2483	2585	2686	2786	2886	2986	3085	3183	3281	3379	3475	3572	68	164	259	355	450	545	641	0	0
1980 AUG 29.0		1139	1139	1143	1150	1162	1180	1206	1245	1302	1393	1533	1733	1772	1732	1692	1652	1612	1573	1533	0	0
JD 2444470.5		2536	2637	2738	2838	2939	3038	3137	3235	3333	3431	3527	0	120	216	311	407	502	597	0	0	0
1980 AUG 19.0		1145	1147	1153	1163	1178	1200	1232	1280	1354	1468	1639	0	1750	1710	1670	1631	1591	1552	0	0	0
JD 2444460.5		2587	2688	2789	2890	2990	3089	3188	3287	3385	3482	3579	75	171	267	362	458	553	0	0	0	0
1980 AUG 9.0		1152	1156	1164	1177	1196	1223	1263	1322	1415	1556	1752	1769	1729	1689	1650	1610	1571	0	0	0	0
JD 2444450.5		2637	2738	2839	2940	3040	3140	3239	3337	3435	3532	0	125	221	317	413	508	0	0	0	0	0
1980 JUL 30.0		1159	1165	1176	1192	1215	1248	1297	1372	1487	1656	0	1748	1709	1669	1630	1590	0	0	0	0	0
JD 2444440.5		2687	2788	2889	2990	3090	3189	3288	3387	3484	3582	79	175	271	367	462	0	0	0	0	0	0
1980 JUL 20.0		1167	1175	1[illegible]	1208	1236	1277	1338	1431	1571	1761	1768	1728	1689	1649	1610	0	0	0	0	0	0
	(FLT T)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E14

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)
JD 2444560.5	396	284	228	195	175	164	158	157	161	170	186	212	254	327	479	937	8926	941	479	327	253
1980 NOV 17.0	340	325	313	304	298	296	298	305	317	337	368	412	478	576	719	896	997	998	991	981	967
JD 2444550.5	298	230	192	169	156	148	146	148	154	167	186	219	273	378	639	2206	1386	546	345	257	209
1980 NOV 7.0	334	321	311	304	301	302	307	317	335	361	401	458	543	668	835	982	999	994	985	973	957
JD 2444540.5	232	188	162	147	138	134	134	138	147	162	187	227	300	460	1043	0	651	367	260	206	174
1980 OCT 28.0	330	319	311	306	306	309	318	333	356	391	442	515	623	775	940	0	997	989	978	963	945
JD 2444530.5	183	154	137	127	121	120	122	129	140	158	187	238	340	623	3846	853	397	263	201	166	145
1980 OCT 18.0	327	318	312	310	312	319	332	353	383	427	492	585	718	884	996	998	993	983	969	953	933
JD 2444520.5	145	126	115	108	106	106	110	118	131	152	188	254	408	1110	1424	445	267	195	157	134	120
1980 OCT 8.0	325	319	315	316	321	332	350	376	415	471	552	668	822	969	1000	995	987	975	960	942	921
JD 2444510.5	114	102	95	91	90	92	98	107	121	146	188	277	552	0	532	273	187	145	122	107	98
1980 SEP 28.0	325	321	320	324	332	347	371	405	454	524	624	762	920	0	998	991	981	967	950	930	907
JD 2444500.5	88	80	76	74	75	78	84	94	110	137	189	318	1082	748	283	178	132	107	93	84	78
1980 SEP 18.0	326	324	326	333	346	366	396	438	499	586	707	860	985	999	994	986	973	957	939	917	894
JD 2444490.5	65	61	59	58	60	63	70	80	96	126	191	412	0	303	165	116	91	77	68	63	0
1980 SEP 8.0	329	330	335	345	362	388	425	478	553	658	798	944	0	997	990	979	965	947	927	904	0
JD 2444480.5	45	43	42	42	44	47	53	63	79	111	193	843	352	148	95	72	59	51	46	0	0
1980 AUG 29.0	333	337	345	359	382	414	460	524	615	739	887	993	999	994	984	971	955	936	915	0	0
JD 2444470.5	26	25	25	26	28	30	35	42	56	86	199	0	121	68	49	39	33	29	0	0	0
1980 AUG 19.0	339	345	357	376	404	444	500	578	686	824	958	0	997	989	978	963	945	925	0	0	0
JD 2444460.5	9	9	9	9	10	11	13	17	24	43	234	67	30	19	15	12	11	0	0	0	0
1980 AUG 9.0	346	356	372	396	430	478	546	639	763	904	996	999	993	984	970	954	935	0	0	0	0
JD 2444450.5	8	8	8	8	9	10	13	17	27	64	0	35	20	14	11	10	0	0	0	0	0
1980 JUL 30.0	355	369	389	418	460	518	598	707	842	966	0	996	989	977	962	944	0	0	0	0	0
JD 2444440.5	23	24	25	27	30	36	45	65	117	734	172	78	52	39	33	0	0	0	0	0	0
1980 JUL 20.0	366	383	408	444	494	562	657	780	915	997	999	993	983	970	953	0	0	0	0	0	0

(FLT T)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E14

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)
JD 2444560.5	-917	-943	-964	-980	-991	996	995	986	968	939	895	831	737	599	397	147	5	-2	-13	-29	-52
1980 NOV 17.0	1863	1852	1844	1837	1834	1834	1838	1849	1867	1894	1936	1998	2090	2228	2432	2691	2855	3074	3096	3113	3127
JD 2444550.5	-933	-956	-973	-986	-993	994	987	972	947	909	852	769	648	472	234	26	-0	-8	-22	-42	-69
1980 NOV 7.0	1871	1862	1855	1850	1849	1852	1861	1876	1900	1937	1992	2072	2192	2369	2612	2836	3077	3101	3120	3135	3145
JD 2444540.5	-947	-966	-981	-989	993	988	976	954	920	870	797	691	537	322	86	0	-4	-16	-34	-58	-88
1980 OCT 28.0	1881	1873	1867	1865	1867	1873	1886	1908	1940	1988	2059	2163	2317	2535	2783	0	3106	3127	3143	3155	3163
JD 2444530.5	-958	-975	-985	991	989	979	961	931	886	822	729	595	404	167	6	-1	-11	-26	-48	-76	-109
1980 OCT 18.0	1892	1886	1882	1882	1887	1898	1916	1945	1987	2049	2140	2273	2465	2710	2891	3110	3133	3151	3164	3174	3179
JD 2444520.5	-968	-981	-988	989	982	966	940	901	844	763	646	478	256	45	-0	-6	-19	-39	-64	-95	-131
1980 OCT 8.0	1904	1900	1899	1902	1911	1926	1951	1988	2043	2122	2237	2405	2631	2857	3113	3138	3158	3173	3184	3191	3194
JD 2444510.5	-976	-985	988	984	971	949	914	864	793	690	545	345	117	0	-3	-13	-30	-53	-82	-116	-155
1980 SEP 28.0	1918	1916	1918	1924	1938	1959	1991	2039	2108	2208	2353	2555	2793	0	3143	3164	3181	3194	3203	3207	3207
JD 2444500.5	-981	987	985	975	956	926	882	819	730	603	426	205	22	-0	-8	-22	-43	-69	-101	-138	-179
1980 SEP 18.0	1934	1934	1939	1950	1968	1996	2038	2098	2185	2310	2487	2715	2914	3147	3170	3189	3204	3214	3220	3222	3220
JD 2444490.5	-984	985	978	963	937	899	843	765	655	500	296	83	0	-4	-15	-33	-57	-87	-122	-162	0
1980 SEP 8.0	1951	1954	1963	1978	2002	2039	2091	2166	2274	2428	2636	2860	0	3175	3196	3213	3225	3232	3236	3236	0
JD 2444480.5	985	981	969	947	914	865	797	701	566	384	167	11	-1	-9	-24	-46	-73	-106	-144	0	0
1980 AUG 29.0	1970	1977	1989	2010	2041	2087	2152	2246	2378	2562	2786	2960	3180	3203	3221	3235	3244	3250	3251	0	0
JD 2444470.5	983	974	956	927	885	825	741	625	465	261	62	0	-5	-17	-35	-60	-91	-127	0	0	0
1980 AUG 19.0	1991	2002	2019	2046	2085	2142	2222	2337	2496	2705	2915	0	3208	3229	3244	3256	3263	3266	0	0	0
JD 2444460.5	978	964	939	903	851	778	677	537	353	143	6	-1	-10	-26	-48	-76	-110	0	0	0	0
1980 AUG 9.0	2015	2029	2052	2086	2135	2204	2302	2440	2626	2844	3000	3213	3235	3253	3266	3275	3280	0	0	0	0
JD 2444450.5	970	950	919	874	811	723	602	439	237	51	0	-5	-18	-37	-63	-94	0	0	0	0	0
1980 JUL 30.0	2040	2059	2088	2130	2190	2275	2393	2556	2762	2981	0	3241	3261	3276	3287	3294	0	0	0	0	0
JD 2444440.5	960	934	895	840	764	659	517	332	129	4	-1	-11	-27	-50	-78	0	0	0	0	0	0
1980 JUL 20.0	2068	2093	2128	2180	2252	2354	2494	2681	2892	3037	3246	3268	3285	3298	3306	0	0	0	0	0	0

(FLT T)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E14

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

	(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)
JD 2444560.5		186	194	202	210	218	226	235	245	254	265	277	292	313	346	418	673	3797	117	118	119	121
1980 NOV 17.0		281	290	299	308	317	326	335	345	354	363	372	381	390	398	406	413	417	257	260	263	266
JD 2444550.5		190	198	206	214	223	232	241	250	261	273	287	305	332	386	537	1579	117	118	119	120	121
1980 NOV 7.0		287	296	305	314	323	333	342	351	360	369	378	387	396	404	411	416	257	259	262	266	269
JD 2444540.5		194	202	211	219	228	237	246	256	268	281	297	321	362	461	878	0	117	118	119	121	122
1980 OCT 28.0		294	302	312	321	330	339	348	357	366	376	384	393	402	409	415	0	259	262	265	268	272
JD 2444530.5		199	207	215	224	233	242	252	263	276	291	311	345	413	631	3283	117	117	118	120	121	123
1980 OCT 18.0		300	309	318	327	336	345	354	364	373	382	390	399	407	414	418	258	261	264	267	271	275
JD 2444520.5		203	211	220	228	238	248	258	270	284	303	330	381	512	1205	116	117	118	119	120	122	124
1980 OCT 8.0		306	315	324	333	342	351	361	370	379	388	396	404	412	417	258	260	263	266	270	274	278
JD 2444510.5		207	215	224	233	243	253	265	278	295	318	358	444	751	0	116	117	118	119	121	123	125
1980 SEP 28.0		312	321	330	339	348	357	367	376	385	393	402	409	416	0	260	263	266	269	273	277	281
JD 2444500.5		211	220	229	238	249	260	272	288	308	339	401	570	1721	116	117	117	119	120	122	124	126
1980 SEP 18.0		317	327	336	345	354	363	373	382	390	399	407	414	419	259	262	265	268	272	275	280	284
JD 2444490.5		216	224	234	244	254	266	281	299	325	370	476	890	0	116	117	118	119	121	123	125	0
1980 SEP 8.0		323	332	342	351	360	369	378	387	396	404	412	418	0	261	264	267	271	274	278	283	0
JD 2444480.5		220	229	239	249	261	274	290	313	348	419	628	2493	116	116	117	118	120	121	123	0	0
1980 AUG 29.0		329	338	348	357	366	375	384	393	401	409	416	420	261	263	266	270	273	277	281	0	0
JD 2444470.5		224	234	244	255	267	282	302	331	382	505	1027	0	116	117	118	119	120	122	0	0	0
1980 AUG 19.0		335	344	353	363	372	381	390	398	406	414	419	0	263	266	269	272	276	280	0	0	0
JD 2444460.5		229	239	249	261	275	292	316	355	435	677	3460	115	116	117	118	119	121	0	0	0	0
1980 AUG 9.0		340	350	359	368	377	386	395	403	411	418	422	262	265	268	271	275	279	0	0	0	0
JD 2444450.5		233	244	255	268	284	304	335	391	528	1135	0	116	116	117	119	120	0	0	0	0	0
1980 JUL 30.0		346	355	365	374	383	392	400	408	415	[illegible]	0	264	267	270	274	277	0	0	0	0	0
JD 2444440.5		238	249	261	275	294	319	361	447	711	4164	115	116	117	118	119	0	0	0	0	0	0
1980 JUL 20.0		352	361	370	379	388	397	405	413	419	423	264	267	269	273	276	0	0	0	0	0	0

	(FLT T)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E14

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)
JD 2444560.5 1980 NOV 17.0	1344	1287	1244	1213	1193	1185	1189	1206	1242	1299	1389	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444550.5 1980 NOV 7.0	1305	1258	1223	1200	1187	1187	1200	1230	1281	1359	1479	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444540.5 1980 OCT 28.0	1274	1235	1207	1191	1186	1195	1220	1264	1333	1439	1524	1524	1524	1524	1524	0	1524	1524	1524	1524	1524
JD 2444530.5 1980 OCT 18.0	1248	1216	1196	1187	1192	1212	1249	1310	1403	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444520.5 1980 OCT 8.0	1227	1203	1190	1190	1205	1237	1290	1372	1494	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444510.5 1980 SEP 28.0	1211	1194	1190	1199	1225	1272	1343	1451	1524	1524	1524	1524	1524	0	1524	1524	1524	1524	1524	1524	1524
JD 2444500.5 1980 SEP 18.0	1200	1191	1196	1216	1255	1318	1412	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444490.5 1980 SEP 8.0	1194	1194	1208	1241	1295	1377	1498	1524	1524	1524	1524	1524	0	1524	1524	1524	1524	1524	1524	1524	0
JD 2444480.5 1980 AUG 29.0	1194	1203	1228	1275	1346	1452	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	0	0
JD 2444470.5 1980 AUG 19.0	1199	1218	1256	1318	1410	1524	1524	1524	1524	1524	1524	0	1524	1524	1524	1524	1524	1524	0	0	0
JD 2444460.5 1980 AUG 9.0	1210	1241	1293	1373	1489	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	0	0	0	0
JD 2444450.5 1980 JUL 30.0	1228	1271	1340	1440	1524	1524	1524	1524	1524	1524	0	1524	1524	1524	1524	1524	0	0	0	0	0
JD 2444440.5 1980 JUL 20.0	1253	1310	1396	1520	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	0	0	0	0	0	0

(FLT T)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)

JD2445000.5 1982 JAN 31.0 JD2445040.5 1982 MAR 12.0 JD2445080.5 1982 APR 21.0 JD2445120.5 1982 MAY 31.0 JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E14

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)
JD 2444560.5	0	0	0	0	0	0	0	0	0	0	0	0	210	542	1084	1947	3065	2950	2795	2639	2482
1980 NOV 17.0	828	786	755	733	718	713	717	732	761	809	883	994	1165	1432	1864	2544	3413	3361	3248	3134	3018
JD 2444550.5	0	0	0	0	0	0	0	0	0	0	0	137	420	873	1604	2647	3013	2858	2701	2543	2385
1980 NOV 7.0	818	784	759	742	733	734	746	770	811	875	972	1119	1345	1704	2276	3083	3393	3282	3169	3055	2941
JD 2444540.5	0	0	0	0	0	0	0	0	0	0	73	316	698	1310	2235	0	2923	2766	2607	2449	2290
1980 OCT 28.0	811	78[illegible]	764	753	751	758	778	814	869	953	1080	1272	1572	2047	2759	0	3313	3202	3089	2976	2863
JD 2444530.5	0	0	0	0	0	0	0	0	0	18	228	551	1063	1857	2901	2992	2833	2674	2514	2355	2196
1980 OCT 18.0	806	784	771	766	770	786	816	864	937	1046	1210	1461	1856	2462	3250	3341	3231	3121	3009	2897	2785
JD 2444520.5	0	0	0	0	0	0	0	0	0	151	427	856	1525	2479	3063	2904	2744	2583	2422	2262	2103
1980 OCT 8.0	803	787	779	781	792	817	858	922	1016	1156	1368	1695	2203	2918	3366	3259	3150	3039	2928	2817	2707
JD 2444510.5	0	0	0	0	0	0	0	0	85	321	683	1242	2076	0	2978	2817	2655	2493	2332	2171	2011
1980 SEP 28.0	802	792	790	798	818	853	907	989	1109	1288	1561	1982	2603	0	3284	3176	3067	2958	2848	2738	2629
JD 2444500.5	0	0	0	0	0	0	0	26	230	536	1004	1713	2668	3054	2892	2730	2567	2404	2242	2081	1922
1980 SEP 18.0	803	798	802	818	847	894	964	1067	1219	1448	1796	2320	3019	3307	3201	3094	2986	2877	2768	2660	2553
JD 2444490.5	0	0	0	0	0	0	0	151	411	804	1400	2250	0	2971	2808	2644	2480	2316	2153	1992	0
1980 SEP 8.0	805	806	817	841	881	941	1029	1159	1351	1640	2076	2694	0	3224	3119	3012	2904	2796	2689	2582	0
JD 2444480.5	0	0	0	0	0	0	81	304	635	1133	1865	2803	3052	2888	2723	2558	2393	2229	2067	0	0
1980 AUG 29.0	808	816	835	868	919	995	1105	1267	1508	1868	2397	3068	3247	3142	3037	2930	2824	2717	2611	0	0
JD 2444470.5	0	0	0	0	0	19	211	492	909	1526	2377	0	2972	2806	2640	2474	2308	2144	0	0	0
1980 AUG 19.0	814	828	855	899	963	1057	1194	1395	1694	2135	2740	0	3165	3061	2956	2850	2744	2639	0	0	0
JD 2444460.5	0	0	0	0	0	130	369	719	1237	1977	2892	3058	2892	2725	2557	2390	2224	0	0	0	0
1980 AUG 9.0	821	843	879	934	1014	1130	1298	1546	1912	2434	3075	3188	3085	2981	2876	2771	2666	0	0	0	0
JD 2444450.5	0	0	0	0	59	264	559	992	1620	2461	0	2980	2812	2644	2475	2308	0	0	0	0	0
1980 JUL 30.0	831	861	907	975	1073	1215	1420	1723	2162	2748	0	3108	3005	2901	2797	2693	0	0	0	0	0
JD 2444440.5	0	0	0	0	172	422	785	1312	2050	2940	3070	2902	2733	2563	2395	0	0	0	0	0	0
1980 JUL 20.0	843	882	939	1022	1141	1313	1563	1928	2438	3051	3132	3030	2927	2823	2720	0	0	0	0	0	0

(FLT T)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M18
E14

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)
JD 2444560.5	828	786	755	733	718	713	717	732	761	809	883	995	1375	1974	2948	4491	6479	6311	6043	5772	5500
1980 NOV 17.0	2034	2135	2236	2337	2437	2536	2635	2733	2831	2928	3025	3122	3218	3313	3408	3503	3584	96	191	287	383
JD 2444550.5	818	784	759	742	733	734	746	770	811	875	972	1255	1764	2577	3879	5730	6407	6140	5870	5598	5326
1980 NOV 7.0	2093	2194	2295	2396	2496	2595	2694	2793	2891	2988	3085	3181	3277	3373	3468	3561	61	155	251	346	442
JD 2444540.5	811	783	764	753	751	758	778	814	869	953	1153	1588	2270	3357	4994	0	6236	5967	5697	5425	5153
1980 OCT 28.0	2152	2253	2354	2455	2555	2654	2753	2851	2949	3047	3143	3240	3336	3431	3526	0	119	214	309	405	501
JD 2444530.5	806	784	771	766	770	786	816	864	937	1064	1437	2012	2918	4319	6151	6332	6065	5795	5523	5252	4980
1980 OCT 18.0	2209	2311	2412	2512	2612	2712	2811	2909	3007	3104	3201	3297	3393	3489	3581	81	176	271	367	462	558
JD 2444520.5	803	787	779	781	792	817	858	922	1016	1307	1795	2551	3728	5397	6429	6163	5893	5623	5351	5080	4809
1980 OCT 8.0	2266	2367	2468	2569	2669	2769	2867	2966	3064	3161	3258	3354	3450	3545	43	137	233	328	423	519	615
JD 2444510.5	802	792	790	798	818	853	907	989	1194	1610	2244	3224	4679	0	6261	5993	5722	5451	5180	4909	4641
1980 SEP 28.0	2322	2423	2524	2625	2725	2824	2923	3022	3120	3217	3314	3410	3506	0	98	193	288	384	479	575	671
JD 2444500.5	803	798	802	818	847	894	964	1093	1450	1984	2800	4034	5687	6361	6093	5824	5552	5281	5010	4741	4474
1980 SEP 18.0	2377	2478	2579	2680	2780	2879	2978	3077	3174	3272	3368	3465	3560	57	152	248	343	438	534	630	726
JD 2444490.5	805	806	817	841	881	941	1029	1310	1762	2444	3475	4944	0	6195	5926	5655	5384	5113	4843	4575	0
1980 SEP 8.0	2430	2532	2633	2733	2834	2933	3032	3130	3228	3326	3422	3519	0	111	206	302	397	492	588	684	0
JD 2444480.5	808	816	835	868	919	995	1186	1571	2143	3002	4262	5871	6299	6031	5760	5489	5217	4946	4678	0	0
1980 AUG 29.0	2483	2585	2686	2786	2886	2986	3085	3183	3281	3379	3475	3572	68	164	259	355	450	545	641	0	0
JD 2444470.5	814	828	855	899	963	1077	1406	1887	2602	3662	5118	0	6137	5867	5596	5324	5052	4783	0	0	0
1980 AUG 19.0	2536	2637	2738	2838	2939	3038	3137	3235	3333	3431	3527	0	120	216	311	407	502	597	0	0	0
JD 2444460.5	821	843	879	934	1014	1260	1668	2265	3149	4411	5967	6245	5976	5705	5433	5161	4890	0	0	0	0
1980 AUG 9.0	2587	2688	2789	2890	2990	3089	3188	3287	3385	3482	3579	75	171	267	362	458	553	0	0	0	0
JD 2444450.5	831	861	907	975	1132	1478	1979	2715	3782	5209	0	6088	5817	5545	5272	5001	0	0	0	0	0
1980 JUL 30.0	2637	2738	2839	2940	3040	3140	3239	3337	3435	3532	0	125	221	317	413	508	0	0	0	0	0
JD 2444440.5	843	882	939	1022	1313	1735	2348	3241	4469	5991	6201	5932	5660	5387	5114	0	0	0	0	0	0
1980 JUL 20.0	2687	2788	2889	2990	3090	3189	3288	3387	3484	3582	79	175	271	367	462	0	0	0	0	0	0
(FLT T)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)	(650)	(660)	(670)	(680)	(690)	(700)	(710)	(720)	(730)	(740)	(750)	(760)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

M19
E09

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444340.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671746	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.601	DEGREES
MEAN ANOM. AT EPOCH	=	96.768	DEGREES
DATE OF NODAL PASSAGE	=	2444505.377	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444340.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338723	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.405	DEGREES
ARG. OF PERIHELION	=	286.291	DEGREES
MEAN ANOM. AT EPOCH	=	204.079	DEGREES
DATE OF NODAL PASSAGE	=	2444072.521	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.062	DEGREES

M19
E09

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

	(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD 2444680.5		722	772	824	878	932	987	1044	1101	1159	1218	1277	1336	1396	1455	1513	1165	826	604	460	361	289
1981 MAR 17.0		697	731	766	802	840	878	917	957	998	1039	1080	1122	1163	1204	1245	984	724	557	453	386	341
JD 2444670.5		754	805	858	911	966	1022	1079	1136	1195	1253	1312	1371	1430	1488	1306	926	666	499	388	309	250
1981 MAR 7.0		713	748	784	821	860	899	939	979	1021	1062	1104	1146	1187	1228	1093	797	598	475	397	345	310
JD 2444660.5		786	838	891	946	1001	1057	1114	1172	1230	1289	1347	1406	1464	1450	1043	738	545	418	331	266	217
1981 FEB 25.0		729	765	802	840	879	919	960	1001	1043	1085	1127	1169	1210	1204	883	647	501	410	351	311	283
JD 2444650.5		819	872	925	980	1036	1092	1149	1207	1266	1324	1382	1441	0	1174	825	599	454	355	285	231	190
1981 FEB 15.0		745	782	820	859	899	939	981	1022	1065	1107	1149	1191	0	982	708	534	427	359	313	282	260
JD 2444640.5		852	905	960	1015	1071	1128	1185	1243	1301	1359	1417	1475	1315	927	662	495	384	306	247	202	167
1981 FEB 5.0		761	798	837	877	918	959	1001	1043	1085	1128	1170	1212	1090	781	575	449	369	317	281	256	239
JD 2444630.5		886	939	994	1050	1106	1163	1220	1278	1336	1394	1452	1457	1047	738	544	417	330	266	217	179	150
1981 JAN 26.0		776	815	855	895	936	978	1021	1063	1106	1148	1190	1197	868	625	476	383	323	282	254	234	221
JD 2444620.5		919	973	1029	1085	1141	1198	1256	1314	1371	1429	1486	1180	879	601	456	358	287	234	192	160	135
1981 JAN 16.0		792	831	872	913	955	997	1039	1082	1125	1167	1209	967	688	510	401	332	285	253	230	215	204
JD 2444610.5		953	1008	1063	1120	1176	1234	1291	1349	1406	1463	1323	937	670	502	390	312	253	208	172	145	125
1981 JAN 6.0		807	847	888	930	972	1015	1058	1100	1143	1185	1074	763	554	425	344	290	253	228	209	197	189
JD 2444600.5		986	1042	1098	1154	1211	1269	1326	1383	1440	1464	1061	753	556	428	340	275	225	186	156	132	117
1980 DEC 27.0		822	863	904	947	989	1032	1075	1118	1160	1179	853	608	455	360	298	256	227	206	191	181	175
JD 2444590.5		1020	1076	1132	1189	1246	1303	1361	1418	1474	1200	851	620	472	372	300	246	203	169	142	123	112
1980 DEC 17.0		837	878	920	963	1006	1049	1092	1134	1177	954	675	494	382	310	261	228	203	186	174	167	162
JD 2444580.5		1054	1110	1167	1224	1281	1338	1395	1451	1345	967	697	524	410	329	269	222	185	155	132	116	109
1980 DEC 7.0		851	893	935	978	1021	1064	1107	1150	1060	756	543	411	326	270	231	203	183	169	160	154	151
JD 2444570.5		1087	1144	1201	1258	1315	1372	1429	1485	1099	789	586	454	362	295	243	203	170	143	123	111	108
1980 NOV 27.0		865	907	950	993	1036	1079	1122	1165	850	604	447	347	282	237	205	182	166	154	146	141	140
JD 2444560.5		1121	1177	1235	1292	1349	1406	1462	1243	898	660	506	400	325	268	223	187	157	134	117	108	108
1980 NOV 17.0		879	922	964	1008	1051	1094	1136	953	678	493	375	298	246	209	183	164	150	140	134	130	130

	(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E09

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD 2444680.5	-173	-189	-203	-216	-227	-235	-240	-241	-238	-232	-222	-209	-192	-173	-151	-111	-96	-94	-97	-102	-104
1981 MAR 17.0	2175	2246	2319	2393	2468	2544	2621	2699	2777	2854	2931	3006	3081	3154	3226	2185	2156	2160	2182	2212	2242
JD 2444670.5	-165	-182	-198	-213	-224	-233	-239	-241	-239	-234	-225	-212	-197	-178	-96	-74	-67	-69	-74	-78	-78
1981 MAR 7.0	2157	2228	2301	2374	2450	2526	2603	2681	2759	2836	2913	2989	3064	3138	2146	2102	2096	2113	2140	2171	2198
JD 2444660.5	-158	-176	-193	-208	-221	-231	-238	-240	-240	-235	-227	-216	-201	-84	-54	-42	-41	-46	-50	-52	-48
1981 FEB 25.0	2139	2211	2283	2357	2431	2508	2585	2662	2740	2818	2895	2972	3047	2110	2054	2036	2046	2071	2101	2131	2153
JD 2444650.5	-150	-170	-188	-204	-218	-229	-236	-240	-240	-237	-230	-219	0	-37	-17	-13	-17	-22	-25	-24	-15
1981 FEB 15.0	2123	2193	2266	2339	2414	2490	2567	2644	2722	2800	2878	2954	0	2012	1980	1982	2003	2033	2063	2089	2106
JD 2444640.5	-143	-163	-182	-200	-214	-226	-234	-239	-240	-238	-232	-222	-22	4	13	11	6	1	0	6	22
1981 FEB 5.0	2106	2177	2248	2322	2396	2472	2548	2626	2704	2782	2860	2937	1974	1928	1921	1937	1965	1996	2025	2046	2055
JD 2444630.5	-135	-157	-177	-195	-210	-223	-232	-238	-240	-239	-233	-10	23	38	39	34	28	25	28	39	63
1981 JAN 26.0	2090	2160	2232	2304	2379	2454	2530	2608	2686	2764	2841	1938	1882	1863	1873	1898	1929	1960	1986	2002	2001
JD 2444620.5	-128	-150	-171	-190	-206	-220	-230	-237	-240	-239	-235	39	61	65	61	55	50	49	56	74	107
1981 JAN 16.0	2074	2144	2215	2288	2361	2436	2513	2590	2667	2745	2823	1840	1808	1810	1832	1862	1895	1924	1946	1954	1942
JD 2444610.5	-121	-144	-166	-185	-202	-216	-227	-235	-239	-240	52	80	89	87	81	74	71	74	86	112	152
1981 JAN 6.0	2059	2128	2199	2271	2344	2419	2495	2572	2649	2727	1802	1757	1750	1767	1796	1829	1861	1888	1904	1904	1880
JD 2444600.5	-114	-138	-160	-180	-198	-213	-225	-233	-238	63	96	111	112	106	98	93	92	99	117	150	198
1980 DEC 27.0	2044	2113	2183	2255	2327	2402	2477	2554	2631	1766	1711	1692	1703	1730	1763	1797	1828	1851	1861	1851	1816
JD 2444590.5	-107	-131	-154	-175	-193	-209	-222	-231	-237	107	129	133	129	121	114	110	112	123	147	188	241
1980 DEC 17.0	2029	2097	2167	2238	2311	2385	2460	2536	2613	1670	1637	1640	1663	1696	1732	1766	1795	1813	1816	1795	1749
JD 2444580.5	-100	-125	-148	-169	-189	-205	-219	-229	119	144	153	150	143	135	128	126	131	147	177	224	281
1980 DEC 7.0	2014	2082	2152	2222	2294	2368	2442	2518	1631	1587	1579	1598	1629	1666	1703	1736	1762	1775	1769	1739	1682
JD 2444570.5	-93	-118	-142	-164	-184	-201	-215	-226	156	169	169	163	154	146	140	140	148	169	205	257	316
1980 NOV 27.0	1999	2067	2136	2207	2279	2351	2425	2501	1541	1521	1533	1562	1599	1638	1675	1707	1729	1736	1722	1681	1616
JD 2444560.5	-86	-112	-136	-159	-179	-197	-212	165	182	185	181	172	163	155	151	153	164	190	231	286	345
1980 NOV 17.0	1985	2053	2121	2191	2262	2334	2408	1500	1467	1470	1494	1530	1571	1611	1648	1678	1696	1697	1674	1624	1554
(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

M19
E09

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD 2444680.5	-220	-221	-220	-218	-215	-212	-208	-204	-199	-193	-187	-181	-174	-167	-160	-155	-181	-197	-209	-219	-228
1981 MAR 17.0	2934	2952	2971	2989	3008	3027	3047	3066	3086	3106	3127	3147	3168	3189	3209	3116	3030	2985	2963	2953	2950
JD 2444670.5	-227	-228	-228	-226	-224	-221	-218	-214	-209	-205	-199	-193	-187	-181	-155	-181	-197	-209	-219	-228	-237
1981 MAR 7.0	2882	2900	2919	2938	2957	2977	2997	3017	3038	3058	3079	3100	3121	3143	3098	2993	2935	2907	2895	2890	2890
JD 2444660.5	-233	-234	-234	-233	-231	-229	-226	-223	-219	-215	-210	-205	-199	-156	-181	-196	-207	-216	-225	-234	-244
1981 FEB 25.0	2829	2847	2866	2886	2906	2926	2947	2967	2988	3010	3031	3052	3074	3085	2962	2888	2852	2836	2831	2830	2832
JD 2444650.5	-236	-238	-238	-238	-237	-235	-233	-230	-227	-224	-220	-215	0	-182	-194	-203	-211	-220	-229	-238	-248
1981 FEB 15.0	2775	2794	2814	2834	2854	2875	2896	2917	2938	2960	2982	3004	0	2937	2845	2799	2779	2772	2771	2773	2776
JD 2444640.5	-238	-240	-241	-241	-241	-240	-239	-236	-234	-231	-228	-224	-183	-193	-199	-205	-212	-220	-230	-240	-251
1981 FEB 5.0	2721	2741	2761	2781	2802	2823	2844	2866	2888	2910	2932	2955	2919	2808	2749	2723	2713	2712	2714	2718	2723
JD 2444630.5	-238	-240	-242	-243	-243	-243	-242	-241	-239	-237	-234	-186	-192	-194	-198	-203	-210	-219	-229	-240	-251
1981 JAN 26.0	2668	2687	2708	2728	2749	2771	2793	2815	2837	2860	2882	2906	2777	2703	2669	2656	2654	2656	2661	2667	2671
JD 2444620.5	-236	-239	-241	-243	-244	-244	-244	-244	-243	-241	-239	-193	-190	-190	-193	-198	-206	-215	-226	-238	-251
1981 JAN 16.0	2615	2634	2655	2676	2697	2719	2741	2764	2786	2809	2832	2754	2661	2618	2600	2597	2600	2605	2612	2618	2623
JD 2444610.5	-232	-236	-239	-241	-243	-244	-245	-245	-245	-244	-195	-188	-183	-182	-186	-192	-200	-210	-222	-235	-249
1981 JAN 6.0	2562	2582	2603	2624	2646	2668	2690	2713	2736	2759	2736	2626	2569	2547	2541	2544	2550	2558	2566	2573	2578
JD 2444600.5	-227	-231	-234	-237	-240	-242	-243	-244	-245	-199	-187	-176	-172	-173	-177	-184	-193	-204	-217	-231	-247
1980 DEC 27.0	2510	2530	2551	2573	2594	2617	2639	2662	2685	2722	2597	2525	2495	2486	2489	2496	2506	2516	2524	2531	2536
JD 2444590.5	-220	-224	-229	-232	-235	-238	-240	-242	-243	-188	-171	-162	-160	-162	-167	-175	-185	-197	-211	-226	-244
1980 DEC 17.0	2459	2480	2501	2522	2544	2566	2589	2612	2636	2574	2486	2446	2433	2434	2443	2454	2466	2478	2487	2494	2498
JD 2444580.5	-211	-217	-221	-226	-230	-233	-236	-238	-192	-169	-154	-148	-147	-150	-157	-166	-176	-189	-204	-222	-242
1980 DEC 7.0	2410	2430	2451	2473	2495	2517	2540	2563	2558	2453	2400	2382	2381	2390	2403	2418	2432	2445	2455	2462	2465
JD 2444570.5	-201	-207	-213	-218	-222	-226	-230	-233	-169	-148	-136	-133	-134	-139	-146	-156	-168	-182	-198	-218	-241
1980 NOV 27.0	2361	2382	2403	2424	2446	2469	2492	2515	2427	2359	2333	2329	2337	2352	2369	2387	2404	2418	2429	2435	2437
JD 2444560.5	-191	-197	-203	-209	-214	-219	-223	-172	-144	-127	-119	-118	-121	-127	-135	-146	-159	-174	-192	-214	-241
1980 NOV 17.0	2314	2335	2356	2377	2399	2422	2445	2408	2324	2287	2278	2284	2300	2320	2341	2363	2382	2398	2409	2415	2415
(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

M19
E09

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD 2444680.5 1981 MAR 17.0	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386
JD 2444670.5 1981 MAR 7.0	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372
JD 2444660.5 1981 FEB 25.0	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358
JD 2444650.5 1981 FEB 15.0	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	0	2344	2344	2344	2344	2344	2344	2344	2344
JD 2444640.5 1981 FEB 5.0	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328
JD 2444630.5 1981 JAN 26.0	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312
JD 2444620.5 1981 JAN 16.0	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295
JD 2444610.5 1981 JAN 6.0	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277
JD 2444600.5 1980 DEC 27.0	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258
JD 2444590.5 1980 DEC 17.0	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238
JD 2444580.5 1980 DEC 7.0	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217
JD 2444570.5 1980 NOV 27.0	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194
JD 2444560.5 1980 NOV 17.0	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169

(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)

JD2444000.5
1979 MAY 7.0

JD2444040.5
1979 JUN 16.0

JD2444080.5
1979 JUL 26.0

JD2444120.5
1979 SEP 4.0

JD2444160.5
1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

M19
E09

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

	(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD 2444680.5		26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
1981 MAR 17.0		37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
JD 2444670.5		42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42
1981 MAR 7.0		58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
JD 2444660.5		57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
1981 FEB 25.0		80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
JD 2444650.5		73	73	73	73	73	73	73	73	73	73	73	73	0	73	73	73	73	73	73	73	73
1981 FEB 15.0		102	102	102	102	102	102	102	102	102	102	102	102	0	102	102	102	102	102	102	102	102
JD 2444640.5		88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88
1981 FEB 5.0		124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124
JD 2444630.5		104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
1981 JAN 26.0		146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146
JD 2444620.5		119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119
1981 JAN 16.0		169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169
JD 2444610.5		135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135
1981 JAN 6.0		192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192
JD 2444600.5		151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151
1980 DEC 27.0		216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216
JD 2444590.5		166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166
1980 DEC 17.0		240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240
JD 2444580.5		182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182
1980 DEC 7.0		264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264
JD 2444570.5		197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197
1980 NOV 27.0		289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289
JD 2444560.5		212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
1980 NOV 17.0		314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314

(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)

JD2444000.5
1979 MAY 7.0

JD2444040.5
1979 JUN 16.0

JD2444080.5
1979 JUL 26.0

JD2444120.5
1979 SEP 4.0

JD2444160.5
1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E09

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD 2444680.5	1366	1270	1173	1078	982	887	791	696	601	505	409	313	216	120	25	3522	3424	3325	3225	3125	3024
1981 MAR 17.0	1011	1069	1127	1183	1239	1295	1350	1405	1459	1513	1568	1622	1677	1732	1786	-1512	-1231	-1027	-869	-734	-611
JD 2444670.5	1303	1207	1111	1015	919	824	729	633	538	442	347	251	154	58	3556	3460	3361	3262	3162	3062	2961
1981 MAR 7.0	1049	1107	1164	1221	1276	1332	1386	1441	1495	1549	1603	1658	1712	1767	-1631	-1319	-1092	-922	-781	-656	-540
JD 2444660.5	1240	1144	1048	952	856	761	666	570	475	380	284	188	92	3583	3494	3397	3298	3199	3099	2999	2898
1981 FEB 25.0	1088	1145	1202	1258	1313	1368	1423	1477	1531	1585	1639	1694	1748	-1731	-1417	-1163	-978	-830	-702	-584	-473
JD 2444650.5	1177	1081	985	889	793	698	603	507	412	316	221	125	0	3528	3432	3334	3235	3136	3036	2936	2835
1981 FEB 15.0	1125	1183	1239	1295	1350	1405	1459	1513	1567	1621	1675	1729	0	-1526	-1241	-1038	-881	-749	-630	-517	-409
JD 2444640.5	1114	1017	921	825	730	634	539	444	349	253	158	63	3560	3465	3368	3270	3172	3072	2973	2872	2772
1981 FEB 5.0	1163	1220	1276	1331	1386	1441	1495	1549	1603	1657	1711	1764	-1641	-1329	-1103	-935	-798	-676	-563	-455	-350
JD 2444630.5	1050	954	858	762	666	571	476	380	285	190	95	3582	3499	3402	3305	3207	3108	3009	2909	2809	2708
1981 JAN 26.0	1200	1256	1312	1368	1422	1477	1531	1585	1639	1693	1746	-1726	-1428	-1175	-993	-849	-724	-610	-502	-397	-294
JD 2444620.5	987	890	794	699	603	508	412	317	222	127	35	3531	3436	3339	3242	3144	3045	2945	2846	2746	2645
1981 JAN 16.0	1236	1293	1348	1403	1458	1512	1567	1620	1674	1728	1780	-1537	-1255	-1054	-902	-774	-659	-551	-446	-343	-241
JD 2444610.5	924	827	731	635	540	445	349	254	159	65	3562	3469	3373	3276	3179	3080	2982	2883	2783	2682	2582
1981 JAN 6.0	1272	1328	1384	1439	1494	1548	1602	1656	1710	1763	-1651	-1345	-1122	-958	-826	-709	-600	-496	-394	-293	-193
JD 2444600.5	861	765	668	573	477	382	287	192	97	3582	3502	3407	3310	3213	3116	3018	2919	2820	2720	2620	2519
1980 DEC 27.0	1308	1364	1419	1474	1529	1583	1637	1691	1745	-1728	-1446	-1197	-1019	-879	-760	-651	-547	-446	-346	-247	-148
JD 2444590.5	799	702	606	510	415	320	224	130	37	3535	3440	3345	3248	3151	3054	2955	2857	2757	2658	2557	2457
1980 DEC 17.0	1343	1399	1454	1509	1564	1618	1672	1726	1779	-1558	-1281	-1084	-936	-813	-703	-600	-500	-401	-303	-205	-106
JD 2444580.5	737	640	544	449	353	258	163	69	3566	3474	3379	3283	3186	3089	2992	2894	2795	2696	2596	2496	2395
1980 DEC 7.0	1377	1433	1489	1544	1599	1653	1707	1761	-1673	-1376	-1156	-996	-868	-756	-653	-554	-457	-360	-263	-166	-68
JD 2444570.5	676	579	483	388	292	197	102	18	3509	3414	3318	3222	3125	3028	2931	2833	2734	2635	2535	2435	2334
1980 NOV 27.0	1412	1468	1523	1578	1633	1687	1741	1790	-1482	-1236	-1060	-924	-810	-707	-609	-513	-419	-324	-228	-131	-33
JD 2444560.5	616	519	423	327	232	137	43	3543	3449	3354	3258	3162	3065	2968	2871	2772	2674	2574	2475	2374	2273
1980 NOV 17.0	1445	1501	1557	1612	1667	1721	1775	-1598	-1326	-1130	-984	-866	-761	-664	-570	-477	-385	-291	-196	-99	-2
(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

M19
E09

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD 2444680.5	197	169	152	142	137	135	138	144	156	175	206	260	367	653	3246	999	447	292	222	183	160
1981 MAR 17.0	698	725	754	783	811	839	867	893	917	940	959	975	988	996	1000	926	742	586	478	405	354
JD 2444670.5	194	172	159	151	148	149	155	166	184	212	260	350	558	1476	1974	612	366	266	214	184	165
1981 MAR 7.0	715	743	772	801	829	857	884	909	932	953	970	984	994	999	974	805	631	507	423	366	326
JD 2444660.5	192	175	165	160	160	164	174	190	216	259	335	496	1003	6729	874	460	317	248	208	184	169
1981 FEB 25.0	733	762	791	819	847	875	900	924	946	964	979	991	998	996	871	683	541	445	380	335	304
JD 2444650.5	191	177	171	169	172	180	194	218	256	322	450	782	0	1360	583	377	284	233	203	184	174
1981 FEB 15.0	751	780	809	837	865	891	916	938	958	975	987	996	0	931	742	581	471	397	346	310	285
JD 2444640.5	189	180	176	178	184	197	218	252	308	412	650	1630	2590	759	448	324	259	221	198	184	177
1981 FEB 5.0	770	799	827	855	882	908	931	952	969	983	993	999	976	807	628	501	416	359	319	290	271
JD 2444630.5	188	182	182	187	197	216	246	294	380	558	1107	8017	1035	537	368	286	240	211	194	185	181
1981 JAN 26.0	788	817	845	873	899	923	945	963	979	990	998	995	874	683	538	440	375	329	297	275	259
JD 2444620.5	186	184	187	196	212	238	280	351	488	841	3183	1552	653	419	315	258	224	203	190	185	185
1981 JAN 16.0	806	835	863	890	915	937	957	974	987	996	1000	934	745	581	469	394	342	306	280	262	250
JD 2444610.5	185	186	193	207	229	264	323	431	676	1654	2895	819	480	345	276	235	210	195	187	185	189
1981 JAN 6.0	824	853	880	906	929	950	968	983	993	999	978	813	632	504	417	358	316	287	266	251	242
JD 2444600.5	184	189	200	218	248	297	383	560	1095	8880	1084	555	379	294	245	216	198	188	184	185	193
1980 DEC 27.0	842	870	896	921	943	962	978	990	997	995	882	692	545	445	377	330	296	272	255	243	236
JD 2444590.5	183	191	206	231	271	340	471	804	2867	1603	655	417	312	255	220	199	187	181	180	185	197
1980 DEC 17.0	859	886	912	935	956	973	986	995	1000	943	759	594	479	400	346	307	280	260	246	236	231
JD 2444580.5	181	194	214	247	301	400	622	1468	3112	802	463	331	263	224	199	184	176	174	177	186	202
1980 DEC 7.0	876	902	927	948	967	982	993	999	984	831	651	519	428	366	322	290	266	250	238	231	227
JD 2444570.5	180	196	223	266	341	494	942	7166	1053	521	352	271	226	198	181	171	167	167	174	186	207
1980 NOV 27.0	892	917	940	960	977	989	997	1000	901	717	567	462	390	339	302	275	256	242	232	227	224
JD 2444560.5	178	199	233	290	399	665	2118	1601	603	377	279	227	195	176	164	158	157	161	170	186	213
1980 NOV 17.0	907	931	953	971	985	995	999	959	790	623	502	419	360	318	287	264	247	235	227	223	222
(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E09

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD 2444680.5	-514	-461	-409	-357	-306	-257	-210	-166	-126	-91	-60	-35	-17	-4	0	97	340	546	688	786	853
1981 MAR 17.0	2889	2905	2920	2932	2943	2951	2956	2958	2956	2951	2942	2929	2911	2889	2862	2549	2296	2089	1948	1854	1790
JD 2444670.5	-479	-426	-374	-323	-273	-225	-181	-140	-103	-70	-43	-23	-8	-0	35	256	484	647	757	834	887
1981 MAR 7.0	2890	2905	2918	2929	2938	2944	2947	2946	2942	2935	2923	2907	2886	2861	2606	2370	2138	1976	1868	1796	1746
JD 2444660.5	-444	-392	-340	-290	-241	-195	-153	-115	-81	-52	-29	-12	-2	6	169	414	600	725	811	871	913
1981 FEB 25.0	2889	2903	2915	2924	2931	2935	2936	2934	2927	2917	2902	2883	2859	2632	2448	2196	2011	1887	1805	1748	1710
JD 2444650.5	-409	-357	-306	-257	-211	-167	-127	-92	-61	-36	-17	-5	0	90	336	545	688	785	853	900	934
1981 FEB 15.0	2888	2901	2911	2919	2924	2926	2925	2919	2910	2897	2880	2857	0	2521	2265	2053	1911	1817	1754	1710	1679
JD 2444640.5	-375	-324	-274	-226	-181	-140	-103	-71	-44	-23	-8	-1	31	250	481	645	756	832	885	923	949
1981 FEB 5.0	2887	2898	2907	2913	2916	2915	2911	2904	2892	2876	2855	2830	2575	2341	2105	1942	1835	1762	1713	1678	1654
JD 2444630.5	-341	-291	-242	-196	-154	-115	-81	-53	-30	-13	-2	7	163	409	595	721	807	867	910	940	961
1981 JAN 26.0	2885	2894	2901	2905	2906	2903	2897	2886	2872	2853	2829	2598	2420	2168	1981	1857	1774	1718	1679	1652	1633
JD 2444620.5	-308	-259	-212	-168	-128	-93	-62	-37	-18	-5	0	84	327	537	681	779	847	895	929	954	970
1981 JAN 16.0	2881	2889	2894	2896	2895	2890	2881	2868	2850	2828	2801	2494	2240	2028	1885	1791	1727	1683	1652	1630	1615
JD 2444610.5	-276	-228	-183	-142	-104	-72	-45	-24	-9	-1	28	239	469	634	746	823	877	916	945	964	977
1981 JAN 6.0	2877	2883	2886	2886	2882	2875	2863	2847	2827	2801	2547	2320	2085	1921	1813	1740	1689	1654	1629	1612	1600
JD 2444600.5	-246	-199	-156	-117	-83	-54	-30	-13	-3	6	151	392	579	707	795	856	901	933	956	972	981
1980 DEC 27.0	2872	2876	2877	2875	2868	2858	2844	2825	2801	2568	2402	2153	1966	1840	1756	1699	1658	1630	1610	1596	1587
JD 2444590.5	-216	-172	-131	-95	-64	-38	-19	-6	-0	73	305	515	661	762	832	883	919	946	965	978	984
1980 DEC 17.0	2865	2867	2866	2862	2853	2840	2823	2801	2774	2476	2231	2020	1875	1778	1712	1666	1633	1610	1594	1583	1576
JD 2444580.5	-188	-146	-108	-74	-47	-25	-9	-1	20	214	440	608	723	803	861	903	934	957	972	982	986
1980 DEC 7.0	2857	2858	2854	2847	2836	2820	2800	2775	2526	2316	2084	1918	1806	1730	1677	1640	1613	1594	1580	1572	1567
JD 2444570.5	-162	-122	-86	-56	-32	-14	-3	0	125	356	545	677	769	835	883	919	945	964	977	985	987
1980 NOV 27.0	2848	2846	2841	2831	2817	2799	2775	2747	2399	2160	1970	1840	1753	1692	1649	1618	1596	1580	1569	1562	1558
JD 2444560.5	-137	-100	-67	-41	-20	-7	-0	51	264	472	624	730	805	860	901	932	954	971	981	987	988
1980 NOV 17.0	2838	2834	2826	2813	2797	2775	2749	2469	2244	2032	1883	1781	1711	1661	1626	1600	1581	1568	1559	1554	1551
(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)

JD2444000.5	JD2444040.5	JD2444080.5	JD2444120.5	JD2444160.5
1979 MAY 7.0	1979 JUN 16.0	1979 JUL 26.0	1979 SEP 4.0	1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E09

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD 2444680.5	148	144	140	137	134	131	128	126	123	121	120	118	117	117	116	825	451	363	324	302	285
1981 MAR 17.0	305	299	293	287	281	276	271	266	262	258	254	250	247	244	241	398	392	384	375	366	356
JD 2444670.5	146	142	138	135	132	129	126	124	122	120	119	118	117	116	1382	517	384	335	309	291	277
1981 MAR 7.0	301	294	288	283	277	272	267	263	258	254	251	247	244	242	399	394	386	377	368	359	350
JD 2444660.5	143	140	136	133	130	127	125	123	121	119	118	117	116	3401	630	413	348	317	297	282	270
1981 FEB 25.0	296	290	284	278	273	268	264	259	255	251	248	245	242	400	395	388	380	371	362	352	343
JD 2444650.5	141	137	134	131	128	126	123	121	120	118	117	116	0	860	455	365	326	304	288	274	263
1981 FEB 15.0	291	285	280	274	269	264	260	256	252	248	245	242	0	397	390	382	373	364	355	345	336
JD 2444640.5	139	135	132	129	126	124	122	120	119	117	116	116	1460	523	386	337	311	293	279	267	256
1981 FEB 5.0	287	281	275	270	265	261	256	252	248	245	242	239	397	392	384	375	366	357	348	338	329
JD 2444630.5	136	133	130	127	125	122	121	119	118	116	116	3139	642	416	350	319	299	284	272	260	250
1981 JAN 26.0	282	276	271	266	261	257	253	249	245	242	239	398	393	386	378	369	359	350	341	331	322
JD 2444620.5	134	131	128	125	123	121	119	118	117	116	115	886	461	368	329	306	290	276	265	254	244
1981 JAN 16.0	278	272	267	262	257	253	249	246	242	239	236	394	388	380	371	362	352	343	333	324	314
JD 2444610.5	132	129	126	124	121	120	118	117	116	115	1543	534	391	340	314	296	282	269	258	248	238
1981 JAN 6.0	273	268	263	258	254	250	246	242	239	236	395	389	382	373	364	355	345	336	326	317	307
JD 2444600.5	130	127	124	122	120	118	117	116	115	3196	667	424	355	323	302	287	274	263	252	242	232
1980 DEC 27.0	269	264	259	254	250	246	242	239	236	395	390	383	375	366	357	348	338	329	319	310	300
JD 2444590.5	128	125	122	120	118	117	116	115	114	984	476	375	333	310	293	279	267	256	246	236	226
1980 DEC 17.0	264	259	255	250	246	243	239	236	233	391	385	377	368	359	350	341	331	322	312	302	293
JD 2444580.5	125	123	121	119	117	116	115	114	1807	564	402	347	318	299	285	272	261	250	240	230	221
1980 DEC 7.0	260	255	251	247	243	239	236	233	392	386	379	370	361	352	343	333	324	314	305	295	286
JD 2444570.5	124	121	119	117	116	115	114	113	732	443	364	329	307	291	277	265	255	244	234	225	215
1980 NOV 27.0	256	251	247	243	239	236	233	230	387	381	372	364	354	345	336	326	317	307	298	288	279
JD 2444560.5	122	119	118	116	114	113	113	1133	509	389	341	315	297	283	270	259	249	239	229	219	210
1980 NOV 17.0	252	247	243	239	236	233	230	388	382	374	366	357	347	338	329	319	310	300	290	281	271

(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M19 E09

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD 2444680.5 1981 MAR 17.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444670.5 1981 MAR 7.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444660.5 1981 FEB 25.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444650.5 1981 FEB 15.0	772	772	772	772	772	772	772	772	772	772	772	772	0	772	772	772	772	772	772	772	772
JD 2444640.5 1981 FEB 5.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444630.5 1981 JAN 26.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444620.5 1981 JAN 16.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444610.5 1981 JAN 6.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444600.5 1980 DEC 27.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444590.5 1980 DEC 17.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444580.5 1980 DEC 7.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444570.5 1980 NOV 27.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444560.5 1980 NOV 17.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

M19
E09

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD 2444680.5	1640	1775	1915	2061	2211	2365	2523	2685	2850	3017	3186	3356	3526	3696	3864	2865	1920	1333	980	761	619
1981 MAR 17.0	1805	1903	2005	2111	2220	2333	2448	2565	2685	2806	2928	3050	3173	3294	3414	2644	1882	1399	1103	915	792
JD 2444670.5	1725	1863	2006	2154	2306	2462	2622	2785	2950	3118	3286	3456	3625	3794	3269	2195	1491	1072	817	655	549
1981 MAR 7.0	1851	1952	2058	2167	2279	2394	2511	2631	2752	2875	2998	3121	3243	3365	2965	2095	1516	1164	945	803	708
JD 2444660.5	1812	1953	2099	2249	2403	2560	2721	2885	3051	3219	3387	3556	3724	3682	2520	1683	1184	885	698	577	496
1981 FEB 25.0	1897	2002	2110	2222	2337	2454	2574	2695	2818	2941	3065	3189	3311	3293	2348	1659	1239	982	819	711	637
JD 2444650.5	1901	2045	2193	2345	2501	2660	2822	2986	3152	3320	3488	3656	0	2892	1917	1318	965	749	610	519	457
1981 FEB 15.0	1943	2051	2162	2277	2394	2513	2635	2758	2882	3006	3131	3254	0	2639	1835	1333	1030	840	716	633	577
JD 2444640.5	1992	2138	2288	2442	2599	2760	2923	3087	3254	3421	3588	3755	3296	2198	1483	1062	809	650	545	475	428
1981 FEB 5.0	1989	2100	2214	2330	2450	2571	2694	2819	2943	3069	3193	3317	2955	2049	1449	1090	868	726	631	567	524
JD 2444630.5	2083	2232	2384	2540	2699	2860	3024	3189	3355	3522	3688	3703	2531	1684	1181	882	697	577	497	443	407
1981 JAN 26.0	2035	2148	2264	2383	2505	2628	2752	2877	3003	3128	3253	3274	2304	1595	1167	907	742	634	561	511	478
JD 2444620.5	2176	2326	2481	2638	2798	2961	3125	3290	3456	3622	3787	2910	1929	1325	970	754	615	523	461	419	392
1981 JAN 16.0	2080	2196	2314	2435	2558	2682	2808	2934	3060	3185	3309	2596	1777	1265	957	766	641	558	501	463	438
JD 2444610.5	2269	2422	2578	2737	2898	3061	3226	3391	3556	3721	3317	2224	1503	1078	822	661	555	483	434	402	381
1981 JAN 6.0	2125	2242	2363	2485	2610	2735	2861	2988	3114	3238	2909	1998	1389	1023	799	655	559	495	450	421	402
JD 2444600.5	2363	2518	2675	2836	2998	3161	3326	3491	3655	3724	2572	1722	1211	906	716	593	510	453	414	389	374
1980 DEC 27.0	2168	2288	2410	2534	2660	2786	2913	3039	3165	3219	2260	1545	1109	844	677	566	492	441	407	384	371
JD 2444590.5	2457	2614	2773	2934	3097	3261	3425	3590	3753	2964	1988	1374	1008	783	639	542	476	430	399	380	370
1980 DEC 17.0	2211	2333	2456	2582	2708	2835	2961	3088	3213	2556	1740	1219	905	708	580	495	436	396	369	352	342
JD 2444580.5	2551	2710	2870	3033	3196	3360	3524	3687	3379	2307	1574	1134	865	695	582	504	450	413	388	373	367
1980 DEC 7.0	2254	2377	2501	2627	2754	2881	3008	3134	2868	1975	1359	984	751	602	503	435	389	357	336	323	317
JD 2444570.5	2646	2806	2967	3130	3294	3458	3621	3783	2678	1829	1288	965	763	629	539	475	431	400	380	369	366
1980 NOV 27.0	2295	2419	2545	2672	2799	2926	3052	3177	2250	1535	1085	809	633	518	440	387	350	324	308	298	295
JD 2444560.5	2740	2901	3064	3227	3391	3554	3717	3088	2117	1478	1088	845	687	580	506	453	416	390	374	366	366
1980 NOV 17.0	2336	2461	2587	2714	2841	2968	3094	2555	1750	1215	885	677	541	451	389	346	316	296	283	276	275
(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)

JD2444000.5	JD2444040.5	JD2444080.5	JD2444120.5	JD2444160.5
1979 MAY 7.0	1979 JUN 16.0	1979 JUL 26.0	1979 SEP 4.0	1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M19 E09

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

	(FLT T)	(680)	(670)	(660)	(650)	(640)	(630)	(620)	(610)	(600)	(590)	(580)	(570)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)
JD 2444680.5		3444	3678	3920	4172	4431	4698	4971	5250	5535	5823	6114	6406	6699	6990	7279	5509	3802	2732	2083	1676	1411
1981 MAR 17.0		1366	1270	1173	1078	982	887	791	696	601	505	409	313	216	120	25	3522	3424	3325	3225	3125	3024
JD 2444670.5		3576	3816	4064	4321	4585	4856	5133	5416	5702	5992	6284	6577	6869	7159	6233	4290	3007	2236	1763	1459	1257
1981 MAR 7.0		1303	1207	1111	1015	919	824	729	633	538	442	347	251	154	58	3556	3460	3361	3262	3162	3062	2961
JD 2444660.5		3710	3955	4209	4471	4739	5015	5295	5580	5869	6160	6452	6745	7036	6975	4868	3343	2423	1867	1517	1288	1134
1981 FEB 25.0		1240	1144	1048	952	856	761	666	570	475	380	284	188	92	3583	3494	3397	3298	3199	3099	2999	2898
JD 2444650.5		3845	4096	4355	4621	4894	5173	5456	5744	6034	6326	6618	6910	0	5531	3752	2651	1995	1589	1326	1152	1034
1981 FEB 15.0		1177	1081	985	889	793	698	603	507	412	316	221	125	0	3528	3432	3334	3235	3136	3036	2936	2835
JD 2444640.5		3981	4238	4502	4772	5049	5331	5617	5906	6197	6490	6781	7071	6251	4248	2932	2152	1678	1376	1177	1043	952
1981 FEB 5.0		1114	1017	921	825	730	634	539	444	349	253	158	63	3560	3465	3368	3270	3172	3072	2973	2872	2772
JD 2444630.5		4118	4380	4648	4923	5203	5488	5776	6066	6358	6650	6940	6977	4835	3279	2347	1789	1439	1211	1058	954	885
1981 JAN 26.0		1050	954	858	762	666	571	476	380	285	190	95	3582	3499	3402	3305	3207	3108	3009	2909	2809	2708
JD 2444620.5		4256	4522	4795	5073	5356	5643	5933	6224	6516	6807	7095	5505	3705	2590	1928	1519	1256	1081	962	882	830
1981 JAN 16.0		987	890	794	699	603	508	412	317	222	127	35	3531	3436	3339	3242	3144	3045	2946	2846	2746	2645
JD 2444610.5		4393	4664	4941	5222	5508	5796	6087	6378	6670	6959	6226	4222	2892	2102	1621	1316	1114	978	885	823	784
1981 JAN 6.0		924	827	731	635	540	445	349	254	159	65	3562	3469	3373	3276	3179	3080	2982	2883	2783	2682	2582
JD 2444600.5		4531	4806	5086	5370	5657	5947	6238	6530	6820	6943	4831	3267	2320	1750	1393	1159	1002	894	821	773	745
1980 DEC 27.0		861	765	668	573	477	382	287	192	97	3582	3502	3407	3310	3213	3116	3018	2919	2820	2720	2620	2519
JD 2444590.5		4668	4947	5229	5516	5805	6096	6387	6677	6966	5220	3727	2593	1913	1491	1219	1037	912	826	768	731	712
1980 DEC 17.0		799	702	606	510	415	320	224	130	37	3535	3440	3345	3248	3151	3054	2955	2857	2757	2658	2557	2457
JD 2444580.5		4805	5086	5372	5660	5950	6241	6532	6821	6248	4282	2933	2117	1617	1297	1084	940	839	770	724	697	684
1980 DEC 7.0		737	640	544	449	353	258	163	69	3566	3474	3379	3283	3186	3089	2992	2894	2795	2696	2596	2496	2395
JD 2444570.5		4941	5225	5512	5802	6093	6384	6673	6960	4929	3354	2373	1774	1396	1147	979	862	780	724	688	667	661
1980 NOV 27.0		676	579	483	388	292	197	102	18	3509	3414	3318	3222	3125	3028	2931	2833	2734	2635	2535	2435	2334
JD 2444560.5		5075	5362	5651	5942	6232	6522	6810	5643	3867	2692	1972	1522	1228	1031	894	799	732	686	657	642	641
1980 NOV 17.0		616	519	423	327	232	137	43	3543	3449	3354	3258	3162	3065	2968	2871	2772	2674	2574	2475	2374	2273
	(FLT T)	(560)	(550)	(540)	(530)	(520)	(510)	(500)	(490)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)

JD2444000.5 1979 MAY 7.0 | JD2444040.5 1979 JUN 16.0 | JD2444080.5 1979 JUL 26.0 | JD2444120.5 1979 SEP 4.0 | JD2444160.5 1979 OCT 14.0

EARTH DEPARTURE OR ARRIVAL DATE

M19
E10

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444440.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671734	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.606	DEGREES
MEAN ANOM. AT EPOCH	=	195.328	DEGREES
DATE OF NODAL PASSAGE	=	2444505.374	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444440.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338749	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.407	DEGREES
ARG. OF PERIHELION	=	286.294	DEGREES
MEAN ANOM. AT EPOCH	=	256.481	DEGREES
DATE OF NODAL PASSAGE	=	2444072.519	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.063	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E10

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD 2444680.5	789	235	192	159	136	122	118	125	141	163	194	247	985	317	321	354	394	437	484	533	586
1981 MAR 17.0	341	310	289	274	265	260	258	260	265	273	285	311	829	334	337	356	378	404	431	462	495
JD 2444670.5	250	204	168	142	124	117	120	133	154	182	224	393	385	312	339	376	417	462	510	561	615
1981 MAR 7.0	310	286	269	258	252	249	250	254	260	271	291	393	367	325	340	361	385	412	442	474	509
JD 2444660.5	217	178	149	128	118	117	127	145	170	206	290	822	313	325	358	398	441	488	538	590	646
1981 FEB 25.0	283	264	252	244	240	239	242	248	257	273	320	675	318	324	343	366	392	421	452	486	523
JD 2444650.5	190	157	134	120	115	121	136	159	190	247	746	341	314	342	379	421	466	514	566	620	678
1981 FEB 15.0	260	245	236	230	229	230	235	243	256	285	634	328	310	325	347	371	399	430	463	499	538
JD 2444640.5	167	141	123	115	117	128	148	176	220	378	473	309	327	361	401	444	491	541	594	651	710
1981 FEB 5.0	239	228	221	218	218	222	228	239	260	359	411	299	308	327	350	377	406	439	474	512	553
JD 2444630.5	150	128	116	114	122	138	162	199	282	1246	317	313	343	381	423	469	517	569	624	682	743
1981 JAN 26.0	221	212	208	207	209	214	223	239	286	999	297	291	307	329	354	382	413	448	485	525	568
JD 2444620.5	135	119	113	116	129	150	180	236	589	367	303	326	361	402	446	493	544	597	654	714	778
1981 JAN 16.0	204	198	195	196	200	207	219	248	494	325	277	287	307	331	358	388	421	457	496	538	583
JD 2444610.5	125	114	112	121	138	164	206	337	595	300	310	342	380	423	469	518	570	626	685	748	813
1981 JAN 6.0	189	185	184	186	191	201	220	302	489	268	269	285	307	333	362	393	428	466	507	551	599
JD 2444600.5	117	111	114	127	149	182	254	1216	316	295	322	359	400	444	492	544	598	656	717	782	850
1980 DEC 27.0	175	173	173	177	184	198	237	960	274	252	264	284	308	335	365	399	436	475	519	565	615
JD 2444590.5	112	110	118	135	162	210	435	398	285	303	337	376	420	466	516	570	626	686	750	817	888
1980 DEC 17.0	162	161	163	168	178	201	352	337	239	244	261	283	308	337	369	405	443	485	530	579	632
JD 2444580.5	109	112	124	145	180	275	885	284	285	315	353	394	440	489	541	596	655	717	784	854	927
1980 DEC 7.0	151	151	154	160	175	230	701	235	226	238	258	282	309	339	373	410	451	495	543	594	649
JD 2444570.5	108	114	130	157	211	635	313	269	293	329	369	413	460	511	565	623	684	750	818	891	968
1980 NOV 27.0	140	141	145	154	181	486	256	210	217	234	255	281	309	342	377	416	459	505	556	610	668
JD 2444560.5	108	118	138	174	296	482	258	272	304	342	385	431	481	534	590	651	715	783	855	931	1011
1980 NOV 17.0	130	132	137	152	227	385	201	198	211	230	253	280	310	344	381	423	467	516	569	627	689

(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E10

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

	(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD 2444680.5		-104	-102	-94	-77	-48	-10	31	67	93	114	149	247	762	-366	-243	-212	-207	-211	-219	-228	-235
1981 MAR 17.0		2242	2266	2279	2274	2244	2187	2115	2049	2007	1996	2015	2073	1833	1877	2028	2110	2181	2249	2317	2386	2455
JD 2444670.5		-78	-71	-56	-30	7	52	93	124	147	175	242	505	-468	-261	-206	-193	-194	-202	-212	-222	-231
1981 MAR 7.0		2198	2217	2220	2200	2155	2088	2018	1967	1945	1954	1999	2118	1621	1918	2016	2090	2159	2227	2295	2364	2433
JD 2444660.5		-48	-36	-12	23	70	116	152	178	203	252	404	-453	-300	-204	-178	-176	-183	-193	-205	-217	-227
1981 FEB 25.0		2153	2163	2154	2120	2062	1992	1932	1899	1897	1930	2020	1103	1790	1919	2000	2071	2138	2206	2273	2342	2411
JD 2444650.5		-15	4	38	83	133	175	205	230	268	366	775	-370	-211	-166	-156	-161	-171	-185	-198	-211	-222
1981 FEB 15.0		2106	2106	2083	2035	1968	1902	1858	1844	1864	1931	2037	1618	1818	1910	1983	2052	2119	2185	2252	2320	2389
JD 2444640.5		22	51	93	145	193	229	256	287	355	579	-460	-234	-158	-138	-138	-147	-161	-176	-191	-205	-217
1981 FEB 5.0		2055	2044	2007	1947	1879	1823	1796	1804	1852	1998	1327	1707	1819	1897	1967	2033	2099	2165	2232	2299	2367
JD 2444630.5		63	101	151	204	247	277	306	356	495	-322	-282	-157	-121	-115	-122	-135	-151	-167	-183	-198	-212
1981 JAN 26.0		2001	1977	1927	1860	1796	1755	1748	1780	1880	834	1576	1725	1811	1883	1950	2015	2081	2146	2212	2278	2345
JD 2444620.5		107	153	208	257	294	324	364	456	779	-366	-170	-109	-93	-96	-108	-123	-141	-158	-176	-192	-206
1981 JAN 16.0		1942	1905	1845	1776	1722	1699	1714	1782	2069	1396	1627	1725	1800	1868	1933	1998	2062	2127	2192	2257	2323
JD 2444610.5		152	205	260	304	337	373	439	630	-453	-204	-104	-74	-71	-80	-95	-112	-131	-150	-168	-185	-200
1981 JAN 6.0		1881	1831	1764	1699	1659	1656	1699	1859	1072	1519	1638	1717	1787	1853	1917	1981	2044	2108	2172	2236	2301
JD 2444600.5		198	254	306	345	380	431	555	726	-271	-110	-60	-48	-53	-66	-83	-102	-121	-141	-160	-178	-193
1980 DEC 27.0		1816	1756	1686	1630	1607	1627	1723	169	1389	1548	1635	1707	1774	1838	1901	1964	2027	2089	2152	2215	2278
JD 2444590.5		241	298	346	384	427	514	769	-384	-134	-52	-28	-27	-37	-52	-71	-91	-112	-132	-152	-170	-187
1980 DEC 17.0		1749	1682	1614	1571	1568	1622	1942	1196	1454	1553	1628	1695	1760	1823	1885	1947	2009	2071	2133	2194	2256
JD 2444580.5		281	336	381	423	487	650	-444	-187	-54	-13	-3	-9	-23	-40	-60	-82	-103	-124	-144	-162	-179
1980 DEC 7.0		1682	1611	1550	1523	1544	1679	766	1351	1471	1550	1618	1683	1746	1808	1870	1931	1992	2053	2113	2173	2233
JD 2444570.5		316	369	414	468	577	832	-289	-72	-4	16	15	5	-10	-29	-50	-72	-94	-115	-135	-154	-171
1980 NOV 27.0		1616	1545	1495	1486	1549	2979	1221	1388	1472	1542	1607	1670	1732	1794	1855	1915	1975	2034	2093	2152	2210
JD 2444560.5		345	398	449	529	736	-445	-115	-4	31	38	32	19	1	-19	-40	-62	-84	-106	-126	-146	-163
1980 NOV 17.0		1554	1487	1450	1466	1669	979	1301	1396	1467	1532	1596	1658	1719	1779	1839	1899	1957	2015	2073	2130	2187
	(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)

JD2444200.5 1979 NOV 23.0

JD2444240.5 1980 JAN 2.0

JD2444280.5 1980 FEB 11.0

JD2444320.5 1980 MAR 22.0

JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E10

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD 2444680.5	-228	-237	-246	-254	-263	-271	-280	-290	-301	-318	-347	-420	-557	-47	-153	-186	-200	-207	-209	-209	-207
1981 MAR 17.0	2950	2950	2951	2954	2956	2959	2963	2967	2972	2980	2994	3033	43	2955	2974	2990	3004	3019	3035	3052	3071
JD 2444670.5	-237	-246	-255	-265	-274	-284	-295	-307	-324	-351	-406	-594	94	-122	-177	-199	-211	-216	-218	-218	-216
1981 MAR 7.0	2890	2892	2894	2897	2901	2904	2908	2912	2919	2930	2954	3130	2907	2913	2927	2941	2956	2971	2988	3006	3025
JD 2444660.5	-244	-253	-263	-274	-284	-296	-309	-326	-351	-397	-521	321	-65	-157	-192	-210	-219	-224	-226	-226	-225
1981 FEB 25.0	2832	2835	2839	2842	2845	2849	2852	2858	2866	2882	2947	2993	2855	2866	2879	2892	2907	2923	2940	2959	2979
JD 2444650.5	-248	-259	-270	-281	-294	-308	-325	-349	-388	-477	-660	34	-126	-178	-203	-217	-225	-230	-232	-233	-231
1981 FEB 15.0	2776	2780	2784	2787	2790	2793	2797	2803	2813	2844	3404	2810	2808	2818	2830	2843	2858	2874	2893	2912	2934
JD 2444640.5	-251	-262	-274	-288	-302	-320	-343	-378	-447	-643	204	-75	-156	-192	-211	-223	-230	-235	-237	-238	-237
1981 FEB 5.0	2723	2727	2730	2734	2736	2739	2743	2749	2764	2895	2807	2756	2760	2770	2781	2794	2810	2827	2846	2867	2889
JD 2444630.5	-251	-264	-278	-293	-311	-334	-366	-422	-557	279	3	-123	-174	-200	-216	-226	-233	-238	-240	-241	-241
1981 JAN 26.0	2672	2676	2679	2681	2683	2685	2688	2695	2732	3015	2714	2707	2712	2721	2733	2746	2762	2780	2800	2822	2846
JD 2444620.5	-251	-265	-281	-299	-321	-351	-398	-497	-754	127	-77	-149	-184	-205	-219	-228	-235	-239	-242	-244	-244
1981 JAN 16.0	2623	2627	2629	2631	2632	2632	2634	2644	3029	2696	2660	2659	2664	2673	2685	2699	2715	2734	2755	2778	2803
JD 2444610.5	-249	-265	-284	-305	-334	-375	-451	-649	289	-9	-115	-163	-190	-207	-220	-228	-235	-240	-243	-245	-246
1981 JAN 6.0	2578	2581	2582	2582	2581	2579	2578	2620	2754	2623	2611	2612	2618	2627	2639	2653	2670	2690	2711	2736	2762
JD 2444600.5	-247	-265	-287	-314	-351	-413	-550	-676	89	-70	-135	-170	-192	-207	-219	-227	-234	-239	-243	-245	-247
1980 DEC 27.0	2536	2538	2538	2536	2532	2526	2522	3234	2604	2571	2565	2566	2572	2581	2594	2609	2626	2647	2670	2695	2723
JD 2444590.5	-244	-266	-291	-325	-377	-478	-745	228	-9	-100	-146	-173	-192	-206	-216	-224	-231	-237	-241	-245	-247
1980 DEC 17.0	2498	2499	2497	2492	2483	2469	2521	2623	2541	2524	2520	2522	2529	2538	2551	2566	2585	2606	2630	2657	2686
JD 2444580.5	-242	-267	-298	-343	-421	-604	313	73	-57	-117	-151	-173	-190	-202	-213	-221	-228	-234	-239	-243	-246
1980 DEC 7.0	2465	2464	2459	2450	2433	2400	2762	2525	2492	2481	2478	2481	2487	2497	2510	2526	2545	2568	2593	2621	2652
JD 2444570.5	-241	-270	-310	-373	-502	-816	189	-2	-82	-125	-152	-171	-186	-198	-208	-216	-224	-230	-236	-241	-245
1980 NOV 27.0	2437	2433	2425	2408	2374	2552	2535	2470	2450	2441	2439	2441	2448	2458	2471	2488	2508	2532	2558	2587	2620
JD 2444560.5	-241	-277	-329	-425	-657	326	69	-41	-95	-128	-151	-168	-182	-193	-203	-212	-219	-226	-233	-238	-243
1980 NOV 17.0	2415	2408	2394	2364	2283	2608	2463	2428	2412	2404	2402	2404	2411	2421	2435	2453	2474	2498	2526	2557	2591
(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E10

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD 2444680.5 1981 MAR 17.0	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386
JD 2444670.5 1981 MAR 7.0	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372
JD 2444660.5 1981 FEB 25.0	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358
JD 2444650.5 1981 FEB 15.0	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344
JD 2444640.5 1981 FEB 5.0	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328
JD 2444630.5 1981 JAN 26.0	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312
JD 2444620.5 1981 JAN 16.0	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295
JD 2444610.5 1981 JAN 6.0	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277
JD 2444600.5 1980 DEC 27.0	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258
JD 2444590.5 1980 DEC 17.0	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238
JD 2444580.5 1980 DEC 7.0	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217
JD 2444570.5 1980 NOV 27.0	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194
JD 2444560.5 1980 NOV 17.0	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169

(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)

JD2444200.5 1979 NOV 23.0 JD2444240.5 1980 JAN 2.0 JD2444280.5 1980 FEB 11.0 JD2444320.5 1980 MAR 22.0 JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E10

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD 2444680.5	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
1981 MAR 17.0	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
JD 2444670.5	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42
1981 MAR 7.0	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
JD 2444660.5	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
1981 FEB 25.0	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
JD 2444650.5	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73
1981 FEB 15.0	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
JD 2444640.5	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88
1981 FEB 5.0	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124
JD 2444630.5	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
1981 JAN 26.0	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146
JD 2444620.5	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119
1981 JAN 16.0	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169
JD 2444610.5	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135
1981 JAN 6.0	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192
JD 2444600.5	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151
1980 DEC 27.0	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216
JD 2444590.5	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166
1980 DEC 17.0	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240
JD 2444580.5	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182
1980 DEC 7.0	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264
JD 2444570.5	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197
1980 NOV 27.0	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289
JD 2444560.5	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
1980 NOV 17.0	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314

(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E10

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD 2444680.5	3024	2923	2821	2719	2618	2516	2414	2312	2211	2110	2010	1910	1817	1710	1612	1514	1417	1320	1224	1128	1032
1981 MAR 17.0	-611	-497	-386	-279	-175	-72	27	125	221	313	403	489	567	655	732	807	879	949	1017	1083	1148
JD 2444670.5	2961	2860	2759	2657	2555	2453	2351	2250	2148	2048	1947	1849	1745	1647	1549	1452	1354	1258	1161	1065	970
1981 MAR 7.0	-540	-429	-322	-216	-113	-12	86	182	276	367	455	539	625	703	779	853	924	993	1060	1125	1189
JD 2444660.5	2898	2797	2696	2594	2492	2390	2288	2187	2086	1985	1885	1777	1683	1585	1486	1389	1291	1195	1098	1002	907
1981 FEB 25.0	-473	-365	-259	-156	-54	45	142	237	330	419	505	597	672	750	825	898	968	1036	1102	1167	1230
JD 2444650.5	2835	2734	2632	2531	2429	2327	2225	2124	2022	1922	1826	1719	1620	1521	1423	1325	1228	1131	1035	939	843
1981 FEB 15.0	-409	-304	-200	-98	1	100	196	290	381	469	550	640	719	795	869	941	1010	1078	1143	1207	1270
JD 2444640.5	2772	2670	2569	2467	2365	2264	2162	2060	1959	1860	1753	1656	1557	1458	1360	1262	1165	1068	972	876	780
1981 FEB 5.0	-350	-246	-144	-43	55	153	248	340	430	516	606	685	763	839	912	983	1052	1119	1184	1247	1309
JD 2444630.5	2708	2607	2505	2404	2302	2200	2098	1997	1897	1781	1692	1593	1493	1395	1296	1198	1101	1004	908	812	717
1981 JAN 26.0	-294	-192	-91	8	106	203	297	388	476	578	649	729	807	882	954	1024	1093	1159	1223	1286	1348
JD 2444620.5	2645	2544	2442	2340	2239	2137	2035	1934	1837	1728	1629	1529	1430	1331	1233	1135	1038	941	845	749	653
1981 JAN 16.0	-241	-140	-41	57	155	250	343	433	518	611	692	772	849	923	995	1065	1132	1198	1262	1325	1386
JD 2444610.5	2582	2480	2379	2277	2176	2074	1972	1872	1763	1666	1566	1466	1367	1268	1170	1072	975	878	782	686	590
1981 JAN 6.0	-193	-93	5	103	200	295	387	476	571	652	734	813	889	963	1034	1104	1171	1236	1300	1363	1424
JD 2444600.5	2519	2418	2316	2215	2113	2011	1910	1820	1704	1604	1503	1404	1304	1205	1107	1009	912	815	719	623	527
1980 DEC 27.0	-148	-49	49	146	243	337	428	506	609	692	774	852	928	1002	1073	1142	1209	1274	1338	1400	1461
JD 2444590.5	2457	2355	2254	2152	2051	1949	1850	1742	1642	1542	1441	1341	1242	1143	1045	947	850	753	657	561	465
1980 DEC 17.0	-106	-8	89	187	282	376	466	562	647	731	812	890	966	1039	1110	1179	1246	1311	1374	1437	1499
JD 2444580.5	2395	2294	2192	2091	1989	1888	1777	1682	1581	1480	1380	1280	1180	1081	983	885	788	691	595	499	403
1980 DEC 7.0	-68	29	127	224	320	413	516	598	684	768	849	927	1003	1076	1147	1215	1282	1347	1411	1474	1535
JD 2444570.5	2334	2233	2131	2030	1928	1830	1722	1621	1520	1419	1319	1219	1119	1020	922	824	727	630	534	438	342
1980 NOV 27.0	-33	63	161	258	354	444	544	632	719	803	884	962	1038	1111	1182	1251	1318	1383	1447	1510	1572
JD 2444560.5	2273	2172	2071	1969	1869	1762	1662	1561	1460	1359	1258	1158	1059	960	862	764	667	570	473	378	282
1980 NOV 17.0	-2	95	193	290	385	486	576	666	753	837	918	997	1072	1146	1217	1285	1352	1418	1482	1546	1609

(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E10

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

	(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD 2444680.5		160	146	138	135	137	142	154	173	206	262	378	710	5453	864	419	282	218	182	160	147	139
1981 MAR 17.0		354	319	294	277	266	260	258	259	264	272	282	296	311	333	356	382	412	444	481	520	563
JD 2444670.5		165	154	149	148	153	163	180	210	259	354	583	1766	1565	563	350	259	211	182	165	154	149
1981 MAR 7.0		326	298	279	266	258	255	255	259	265	275	287	303	323	344	369	397	429	464	502	544	588
JD 2444660.5		169	162	159	162	170	186	212	255	333	503	1083	4416	788	434	306	242	205	183	169	162	159
1981 FEB 25.0		304	282	267	257	252	251	254	259	268	279	293	313	332	356	383	413	447	484	525	568	615
JD 2444650.5		174	169	170	176	190	212	250	315	446	801	3968	1199	547	361	276	229	201	183	174	169	170
1981 FEB 15.0		285	268	257	250	248	249	253	261	271	284	299	321	343	369	398	430	466	506	548	594	643
JD 2444640.5		177	176	181	192	211	243	298	401	642	1708	2224	709	428	313	253	218	197	184	177	176	180
1981 FEB 5.0		271	257	249	245	245	248	254	263	275	290	310	330	355	382	414	448	487	529	574	622	672
JD 2444630.5		181	184	192	209	236	282	364	538	1086	7153	971	512	356	279	235	209	193	184	181	183	191
1981 JAN 26.0		259	249	243	241	243	248	256	266	280	302	318	341	367	397	431	468	508	552	600	650	702
JD 2444620.5		185	191	205	228	266	332	462	797	3032	1490	628	405	306	252	220	201	190	185	185	191	203
1981 JAN 16.0		250	242	239	239	242	248	258	270	284	305	327	352	380	413	449	488	531	578	627	679	732
JD 2444610.5		189	199	218	250	304	402	625	1490	3033	801	466	336	270	231	208	194	187	185	189	199	216
1981 JAN 6.0		242	237	235	237	242	250	261	274	294	313	337	364	395	429	467	509	555	604	655	709	763
JD 2444600.5		193	208	234	277	353	510	965	6936	1104	547	371	288	241	213	196	187	183	185	193	207	231
1980 DEC 27.0		236	233	233	236	242	252	264	276	299	321	347	376	409	446	487	531	579	630	684	739	794
JD 2444590.5		197	218	253	312	425	700	2128	1800	662	413	307	251	217	197	186	180	180	186	197	217	248
1980 DEC 17.0		231	229	231	236	243	254	267	286	306	330	358	389	425	464	508	555	605	658	714	770	826
JD 2444580.5		202	229	275	358	538	1145	4824	851	467	329	260	221	197	183	176	174	177	186	202	228	269
1980 DEC 7.0		227	227	230	236	245	257	275	292	314	340	369	403	441	483	529	578	631	687	744	801	856
JD 2444570.5		207	243	305	427	752	3344	1229	542	354	270	223	196	179	170	166	168	174	187	207	240	296
1980 NOV 27.0		224	225	229	236	246	259	278	298	322	347	381	417	458	502	551	603	658	716	774	832	886
~~JD 2444560.5~~		~~213~~	259	345	539	1325	2410	660	387	281	225	194	174	163	158	157	161	171	187	213	256	332
1980 NOV 17.0		222	224	229	237	248	264	282	304	330	360	~~394~~	432	~~475~~	523	~~574~~	~~629~~	~~686~~	746	805	862	915
	(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E10

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

	(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD 2444680.5		853	901	935	959	974	982	-983	-979	-971	-957	-938	-915	-889	-852	-814	-771	-723	-672	-616	-557	-495
1981 MAR 17.0		1790	1745	1715	1694	1680	1671	1667	1666	1668	1673	1679	1687	1693	1706	1716	1727	1738	1748	1758	1767	1774
JD 2444670.5		887	925	951	969	979	983	-981	-974	-962	-946	-924	-898	-865	-829	-788	-742	-692	-637	-580	-519	-457
1981 MAR 7.0		1746	1711	1687	1671	1661	1656	1654	1655	1659	1664	1671	1679	1690	1700	1711	1721	1732	1742	1751	1759	1765
JD 2444660.5		913	943	963	976	982	-982	-977	-967	-952	-933	-908	-875	-843	-804	-760	-711	-659	-602	-543	-481	-417
1981 FEB 25.0		1710	1683	1664	1652	1645	1642	1642	1645	1650	1656	1664	1677	1684	1694	1705	1715	1726	1735	1743	1750	1755
JD 2444650.5		934	957	972	981	-982	-979	-972	-959	-941	-919	-893	-857	-820	-778	-731	-680	-625	-566	-505	-442	-378
1981 FEB 15.0		1679	1658	1644	1636	1632	1630	1632	1636	1642	1649	1656	1669	1679	1689	1699	1710	1719	1728	1735	1741	1745
JD 2444640.5		949	967	978	983	-981	-976	-965	-949	-929	-904	-871	-836	-796	-751	-702	-648	-590	-530	-467	-403	-339
1981 FEB 5.0		1654	1638	1628	1622	1620	1620	1623	1628	1635	1643	1654	1663	1673	1684	1694	1704	1713	1721	1727	1731	1734
JD 2444630.5		961	975	982	-983	-979	-970	-957	-939	-916	-881	-852	-814	-771	-723	-671	-615	-555	-493	-429	-364	-301
1981 JAN 26.0		1633	1621	1613	1610	1609	1611	1615	1621	1629	1643	1648	1658	1668	1679	1689	1698	1706	1713	1718	1721	1722
JD 2444620.5		970	980	984	-982	-975	-964	-948	-927	-903	-868	-833	-792	-745	-695	-640	-581	-519	-456	-391	-326	-263
1981 JAN 16.0		1615	1606	1601	1599	1600	1603	1608	1615	1622	1634	1643	1653	1663	1673	1683	1692	1699	1705	1709	1710	1709
JD 2444610.5		977	983	-983	-980	-971	-957	-938	-915	-883	-851	-812	-768	-719	-665	-608	-547	-483	-418	-353	-289	-227
1981 JAN 6.0		1600	1593	1590	1590	1592	1596	1602	1609	1620	1628	1638	1648	1658	1668	1677	1685	1692	1696	1699	1699	1695
JD 2444600.5		981	985	-983	-977	-965	-949	-928	-906	-869	-833	-791	-744	-692	-636	-576	-512	-447	-381	-316	-252	-192
1980 DEC 27.0		1587	1582	1581	1581	1585	1590	1596	1599	1614	1623	1633	1643	1653	1663	1671	1678	1684	1687	1688	1686	1681
JD 2444590.5		984	986	-981	-973	-959	-941	-918	-887	-853	-814	-769	-719	-664	-605	-543	-478	-411	-345	-279	-216	-158
1980 DEC 17.0		1576	1573	1572	1574	1578	1584	1590	1601	1609	1619	1629	1639	1648	1657	1665	1671	1675	1677	1677	1673	1665
JD 2444580.5		986	-985	-979	-968	-953	-933	-903	-874	-837	-795	-747	-694	-636	-575	-510	-443	-376	-309	-244	-182	-127
1980 DEC 7.0		1567	1565	1565	1568	1572	1578	1589	1595	1604	1614	1624	1634	1643	1651	1658	1663	1666	1667	1664	1658	1649
JD 2444570.5		987	-984	-976	-964	-946	-925	-894	-860	-820	-775	-724	-668	-608	-544	-477	-409	-340	-273	-209	-150	-98
1980 NOV 27.0		1558	1557	1559	1562	1567	1572	1582	1591	1600	1609	1619	1629	1637	1645	1651	1655	1657	1656	1651	1643	1631
JD 2444560.5		988	-982	-973	-959	-940	-913	-883	-846	-803	-755	-701	-642	-579	-513	-444	-374	-305	-239	-176	-119	-71
1980 NOV 17.0		1551	1551	1553	1557	1562	1570	1578	1586	1595	1605	1614	1623	1631	1638	1643	1646	1647	1644	1638	1627	1613
	(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E10

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD 2444680.5	285	272	260	249	239	229	220	211	202	194	186	178	171	163	156	149	142	136	130	124	119
1981 MAR 17.0	356	347	337	328	318	309	299	290	281	271	262	253	245	236	227	219	211	203	195	188	180
JD 2444670.5	277	265	254	243	234	224	215	206	197	189	181	173	165	158	151	145	138	132	126	121	115
1981 MAR 7.0	350	340	331	321	311	302	293	283	274	265	256	247	238	229	221	213	205	197	189	182	175
JD 2444660.5	270	258	248	238	228	219	210	201	192	184	176	168	161	154	147	140	134	128	122	117	112
1981 FEB 25.0	343	333	324	314	305	295	286	276	267	258	249	240	231	223	215	206	198	191	183	176	169
JD 2444650.5	263	252	242	232	222	213	204	196	188	179	172	164	157	149	143	136	130	124	119	113	108
1981 FEB 15.0	336	326	317	307	298	288	279	269	260	251	243	233	225	216	208	200	192	185	177	170	163
JD 2444640.5	256	246	236	226	217	208	199	191	183	175	166	159	152	145	138	132	126	120	115	110	105
1981 FEB 5.0	329	319	310	300	291	281	272	263	253	245	235	227	218	210	202	194	186	178	171	164	157
JD 2444630.5	250	240	230	221	212	203	194	186	178	169	162	155	147	141	134	128	122	116	111	106	101
1981 JAN 26.0	322	312	302	293	284	274	265	256	247	237	229	220	212	203	195	187	180	172	165	158	151
JD 2444620.5	244	234	224	215	206	198	189	181	173	165	157	150	143	136	130	124	118	113	107	103	98
1981 JAN 16.0	314	305	295	286	276	267	258	249	240	231	222	213	205	197	189	181	173	166	159	152	145
JD 2444610.5	238	228	219	210	201	192	184	176	167	160	152	145	138	132	126	120	114	109	104	99	94
1981 JAN 6.0	307	298	288	279	269	260	251	242	232	224	215	207	198	190	182	175	167	160	153	146	140
JD 2444600.5	232	223	213	204	196	187	179	172	163	155	148	141	134	127	121	115	110	105	100	95	91
1980 DEC 27.0	300	291	281	272	262	253	244	235	226	217	208	200	192	184	176	168	161	154	147	140	134
JD 2444590.5	226	217	208	199	190	182	174	165	158	150	143	136	129	123	117	111	106	101	96	92	88
1980 DEC 17.0	293	283	274	265	255	246	237	228	219	210	202	193	185	177	169	162	155	148	141	134	128
JD 2444580.5	221	212	203	194	185	177	168	160	153	145	138	131	125	119	113	107	102	97	92	88	84
1980 DEC 7.0	286	276	267	257	248	239	229	221	212	203	195	187	179	171	163	156	148	142	135	128	122
JD 2444570.5	215	206	197	189	180	172	163	156	148	141	134	127	121	114	109	103	98	93	89	84	81
1980 NOV 27.0	279	269	260	250	241	232	223	214	205	197	188	180	172	164	157	149	142	135	129	122	116
JD 2444560.5	210	201	192	183	175	166	158	151	143	136	129	122	116	110	104	99	94	89	85	81	77
1980 NOV 17.0	271	262	253	243	234	225	216	207	198	190	181	173	165	158	150	143	136	129	123	116	110

(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M19 E10

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD 2444680.5 1981 MAR 17.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444670.5 1981 MAR 7.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444660.5 1981 FEB 25.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444650.5 1981 FEB 15.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444640.5 1981 FEB 5.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444630.5 1981 JAN 26.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444620.5 1981 JAN 16.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444610.5 1981 JAN 6.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444600.5 1980 DEC 27.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444590.5 1980 DEC 17.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444580.5 1980 DEC 7.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444570.5 1980 NOV 27.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444560.5 1980 NOV 17.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772

(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

M19
E10

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

	(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD 2444680.5		619	524	461	419	392	378	375	381	397	423	463	544	2358	671	679	747	831	928	1036	1155	1286
1981 MAR 17.0		792	708	651	613	589	576	572	577	589	609	642	711	2189	771	781	832	893	964	1042	1128	1222
JD 2444670.5		549	477	429	398	381	374	377	390	412	446	507	828	810	662	714	792	883	985	1099	1225	1362
1981 MAR 7.0		708	644	600	572	556	549	551	560	577	606	657	935	862	748	788	845	912	988	1071	1162	1262
JD 2444660.5		496	442	406	385	374	374	383	402	431	480	621	1908	664	687	755	840	937	1046	1166	1297	1440
1981 FEB 25.0		637	588	555	535	525	524	531	545	569	610	734	1739	729	746	797	860	932	1012	1100	1197	1302
JD 2444650.5		457	416	390	376	372	378	392	418	458	545	1704	720	665	721	799	891	994	1109	1235	1373	1522
1981 FEB 15.0		577	539	515	502	498	501	513	533	566	642	1622	755	707	748	807	875	951	1037	1130	1233	1344
JD 2444540.5		428	398	380	372	374	385	405	439	501	796	1010	656	690	760	846	944	1054	1175	1308	1452	1608
1981 FEB 5.0		524	496	479	472	472	480	496	524	577	839	984	678	701	753	816	889	971	1062	1161	1269	1386
JD 2444630.5		407	385	373	371	378	394	422	470	605	3097	672	664	724	803	895	1000	1116	1244	1383	1534	1697
1981 JAN 26.0		478	458	447	444	449	461	483	523	644	2689	673	657	700	758	827	905	991	1087	1192	1306	1429
JD 2444620.5		392	376	370	373	385	407	445	526	1295	772	645	689	761	848	947	1058	1181	1315	1461	1619	1789
1981 JAN 16.0		438	423	417	418	427	444	475	545	1218	747	620	648	700	764	837	920	1012	1113	1224	1344	1473
JD 2444610.5		381	371	370	377	394	424	480	711	1310	639	657	720	801	895	1001	1118	1248	1389	1543	1708	1886
1981 JAN 6.0		402	393	390	395	408	431	477	686	1205	598	599	643	701	769	847	935	1032	1139	1256	1382	1519
JD 2444600.5		374	369	372	384	406	447	557	3010	670	630	682	755	843	944	1056	1181	1317	1466	1627	1800	1986
1980 DEC 27.0		371	365	366	374	391	423	519	2573	614	556	587	639	702	775	858	951	1053	1166	1289	1422	1565
JD 2444590.5		370	368	375	392	422	487	922	840	611	645	711	793	888	995	1114	1246	1389	1545	1714	1895	2090
1980 DEC 17.0		342	340	344	355	377	431	822	766	524	536	579	635	703	781	869	967	1075	1193	1322	1463	1614
JD 2444580.5		367	369	380	402	445	592	2082	609	611	668	743	832	933	1047	1173	1312	1464	1628	1805	1995	2198
1980 DEC 7.0		317	317	323	338	371	501	1816	514	490	522	571	633	705	787	879	983	1097	1221	1358	1505	1665
JD 2444570.5		366	371	386	416	488	1412	663	582	626	694	776	872	980	1101	1235	1381	1541	1713	1899	2099	2312
1980 NOV 27.0		295	297	306	325	384	1196	565	452	469	510	565	630	706	793	891	999	1119	1251	1395	1551	1720
JD 2444560.5		366	375	394	436	631	1033	563	587	646	722	811	914	1029	1157	1298	1453	1620	1802	1998	2207	2432
1980 NOV 17.0		275	279	290	320	493	912	429	422	453	500	558	628	708	799	902	1017	1143	1282	1434	1600	1780
	(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)

JD2444200.5 1979 NOV 23.0

JD2444240.5 1980 JAN 2.0

JD2444280.5 1980 FEB 11.0

JD2444320.5 1980 MAR 22.0

JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E10

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(480)	(470)	(460)	(450)	(440)	(430)	(420)	(410)	(400)	(390)	(380)	(370)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)
JD 2444680.5	1411	1233	1112	1032	981	954	947	958	986	1032	1105	1255	4547	1442	1460	1578	1724	1891	2078	2283	2508
1981 MAR 17.0	3024	2923	2821	2719	2618	2516	2414	2312	2211	2110	2010	1910	1817	1710	1612	1514	1417	1320	1224	1128	1032
JD 2444670.5	1257	1121	1030	971	937	923	928	950	989	1052	1165	1763	1673	1410	1502	1637	1795	1973	2170	2387	2623
1981 MAR 7.0	2961	2860	2759	2657	2555	2453	2351	2250	2148	2048	1947	1849	1745	1647	1549	1452	1354	1258	1161	1065	970
JD 2444660.5	1134	1030	962	920	900	898	914	947	1000	1091	1355	3647	1393	1433	1552	1700	1869	2058	2266	2495	2743
1981 FEB 25.0	2898	2797	2696	2594	2492	2390	2288	2187	2086	1985	1885	1777	1683	1585	1486	1389	1291	1195	1098	1002	907
JD 2444650.5	1034	955	905	878	870	879	905	950	1024	1187	3326	1474	1373	1470	1606	1765	1945	2146	2366	2606	2866
1981 FEB 15.0	2835	2734	2632	2531	2429	2327	2225	2124	2022	1922	1826	1719	1620	1521	1423	1325	1228	1131	1035	939	843
JD 2444640.5	952	894	859	844	846	865	902	963	1078	1636	1994	1334	1392	1513	1662	1833	2025	2237	2469	2721	2994
1981 FEB 5.0	2772	2670	2569	2467	2365	2264	2162	2060	1959	1860	1753	1656	1557	1458	1360	1262	1165	1068	972	876	780
JD 2444630.5	885	842	820	815	827	855	905	993	1249	5786	1345	1321	1423	1561	1722	1904	2107	2331	2575	2840	3126
1981 JAN 26.0	2708	2607	2505	2404	2302	2200	2098	1997	1897	1781	1692	1593	1493	1395	1296	1198	1101	1004	908	812	717
JD 2444620.5	830	800	787	792	812	851	919	1072	2513	1519	1265	1337	1461	1611	1784	1978	2192	2428	2685	2963	3263
1981 JAN 16.0	2645	2544	2442	2340	2239	2137	2035	1934	1837	1728	1629	1529	1430	1331	1233	1135	1038	941	845	749	653
JD 2444610.5	784	764	760	773	802	854	957	1397	2515	1237	1257	1363	1502	1664	1848	2053	2280	2528	2798	3090	3404
1981 JAN 6.0	2582	2480	2379	2277	2176	2074	1972	1872	1763	1666	1566	1466	1367	1268	1170	1072	975	878	782	686	590
JD 2444600.5	745	733	738	758	797	870	1075	5583	1284	1186	1269	1394	1545	1719	1914	2132	2371	2632	2915	3222	3551
1980 DEC 27.0	2519	2418	2316	2215	2113	2011	1910	1820	1704	1604	1503	1404	1304	1205	1107	1009	912	815	719	623	527
JD 2444590.5	712	708	719	747	799	917	1744	1606	1135	1181	1289	1428	1591	1776	1983	2212	2464	2739	3037	3358	3704
1980 DEC 17.0	2457	2355	2254	2152	2051	1949	1850	1742	1642	1542	1441	1341	1242	1143	1045	947	850	753	657	561	465
JD 2444580.5	684	686	703	740	815	1093	3899	1123	1101	1189	1314	1464	1638	1834	2053	2295	2560	2849	3163	3500	3864
1980 DEC 7.0	2395	2294	2192	2091	1989	1888	1777	1682	1581	1480	1380	1280	1180	1081	983	885	788	691	595	499	403
JD 2444570.5	661	668	692	741	871	2608	1229	1034	1095	1204	1341	1502	1687	1894	2125	2381	2660	2964	3294	3649	4033
1980 NOV 27.0	2334	2233	2131	2030	1928	1830	1722	1621	1520	1419	1319	1219	1119	1020	922	824	727	630	534	438	342
JD 2444560.5	641	653	684	756	1124	1944	992	1009	1100	1222	1370	1542	1737	1956	2200	2469	2764	3084	3432	3807	4213
1980 NOV 17.0	2273	2172	2071	1969	1869	1762	1662	1561	1460	1359	1258	1158	1059	960	862	764	667	570	473	378	282
(FLT T)	(360)	(350)	(340)	(330)	(320)	(310)	(300)	(290)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)

JD2444200.5 1979 NOV 23.0 | JD2444240.5 1980 JAN 2.0 | JD2444280.5 1980 FEB 11.0 | JD2444320.5 1980 MAR 22.0 | JD2444360.5 1980 MAY 1.0

EARTH DEPARTURE OR ARRIVAL DATE

M19
E11

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444540.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671723	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.611	DEGREES
MEAN ANOM. AT EPOCH	=	293.888	DEGREES
DATE OF NODAL PASSAGE	=	2444505.370	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444540.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338775	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.410	DEGREES
ARG. OF PERIHELION	=	286.296	DEGREES
MEAN ANOM. AT EPOCH	=	308.883	DEGREES
DATE OF NODAL PASSAGE	=	2444072.516	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.064	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E11

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)
JD 2444680.5	586	641	700	762	827	896	967	1042	1120	1201	1284	1192	997	900	873	893	944	1025	1135	1279	1467
1981 MAR 17.0	495	531	570	611	655	702	751	803	858	915	975	856	673	582	569	609	684	789	922	1088	1295
JD 2444670.5	615	673	733	797	864	934	1007	1084	1164	1246	1332	1054	929	887	898	945	1022	1130	1273	1459	1705
1981 MAR 7.0	509	547	587	631	677	726	777	831	889	949	1012	730	614	586	617	689	791	923	1087	1293	1558
JD 2444660.5	646	705	767	833	902	974	1049	1128	1209	1295	1119	966	905	906	947	1021	1127	1268	1453	1697	2029
1981 FEB 25.0	523	563	606	651	699	750	804	861	921	984	794	652	606	628	694	794	924	1088	1293	1557	1906
JD 2444650.5	678	738	803	870	941	1015	1092	1173	1257	1190	1010	928	917	952	1022	1125	1264	1448	1691	2022	0
1981 FEB 15.0	538	580	624	672	722	776	832	892	955	862	696	629	640	701	799	927	1090	1295	1558	1906	0
JD 2444640.5	710	773	839	908	981	1058	1138	1221	1308	1064	957	932	959	1025	1125	1262	1444	1687	2017	0	0
1981 FEB 5.0	553	596	643	693	746	802	861	924	991	746	657	655	710	804	931	1093	1298	1560	1908	0	0
JD 2444630.5	743	808	877	948	1024	1102	1185	1271	1124	993	952	970	1030	1127	1262	1443	1685	2013	0	0	0
1981 JAN 26.0	568	614	663	715	770	829	892	958	802	689	672	719	810	936	1098	1302	1564	1912	0	0	0
JD 2444620.5	778	845	916	990	1067	1149	1235	1190	1037	976	984	1038	1132	1265	1444	1684	2012	0	0	0	0
1981 JAN 16.0	583	631	683	738	796	858	924	860	726	692	731	818	942	1103	1307	1569	1917	0	0	0	0
JD 2444610.5	813	883	956	1033	1113	1198	1287	1087	1006	1001	1049	1138	1269	0	1686	2013	0	0	0	0	0
1981 JAN 6.0	599	649	703	761	823	889	959	769	715	744	826	949	1109	0	1576	1924	0	0	0	0	0
JD 2444600.5	850	922	998	1078	1162	1250	1144	1042	1023	1063	1147	1275	1451	1689	2016	0	0	0	0	0	0
1980 DEC 27.0	615	668	725	786	851	922	816	743	759	836	956	1115	1320	1583	1932	0	0	0	0	0	0
JD 2444590.5	898	963	1042	1125	1213	1204	1084	1050	1080	1159	1284	1458	1695	2022	0	0	0	0	0	0	0
1980 DEC 17.0	632	688	748	813	883	865	774	776	846	964	1122	1327	1591	1941	0	0	0	0	0	0	0
JD 2444580.5	927	1005	1088	1175	1267	1133	1081	1100	1173	1294	1467	1703	2029	0	0	0	0	0	0	0	0
1980 DEC 7.0	649	709	773	842	917	810	796	858	972	1130	1335	1600	1952	0	0	0	0	0	0	0	0
JD 2444570.5	968	1050	1136	1228	1186	1117	1124	1190	1307	1477	1712	2039	0	0	0	0	0	0	0	0	0
1980 NOV 27.0	668	731	800	875	849	820	871	981	1138	1343	1609	1962	0	0	0	0	0	0	0	0	0
JD 2444560.5	1011	1097	1188	1242	1159	1153	1210	1322	1490	1724	2050	0	0	0	0	0	0	0	0	0	0
1980 NOV 17.0	689	757	830	891	846	887	991	1146	1351	1618	1973	0	0	0	0	0	0	0	0	0	0
(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E11

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

	(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)
JD 2444680.5		-235	-241	-245	-246	-245	-240	-233	-224	-212	-198	-183	-172	-181	-194	-206	-216	-222	-225	-224	-219	-209
1981 MAR 17.0		2456	2526	2596	2667	2737	2807	2875	2942	3007	3070	3131	2340	2378	2434	2498	2566	2636	2710	2786	2864	2944
JD 2444670.5		-231	-239	-244	-246	-245	-242	-236	-228	-217	-205	-190	-162	-176	-191	-204	-214	-222	-226	-225	-221	-212
1981 MAR 7.0		2433	2503	2573	2643	2713	2782	2850	2916	2981	3043	3104	2302	2352	2412	2476	2543	2614	2688	2765	2845	2926
JD 2444660.5		-227	-236	-242	-245	-246	-244	-239	-232	-222	-211	-141	-154	-172	-188	-202	-213	-221	-226	-227	-223	-215
1981 FEB 25.0		2411	2480	2550	2619	2689	2757	2824	2890	2954	3015	2230	2273	2329	2388	2452	2519	2591	2666	2744	2825	2907
JD 2444650.5		-222	-232	-239	-244	-246	-245	-241	-235	-227	-118	-131	-149	-167	-184	-199	-211	-220	-226	-228	-226	0
1981 FEB 15.0		2389	2457	2526	2595	2664	2731	2797	2862	2925	2161	2198	2248	2304	2363	2427	2495	2567	2643	2723	2805	0
JD 2444640.5		-217	-228	-236	-242	-245	-245	-243	-238	-231	-106	-124	-144	-163	-180	-196	-209	-219	-226	-229	0	0
1981 FEB 5.0		2367	2435	2503	2570	2638	2704	2770	2833	2895	2125	2169	2221	2277	2336	2401	2470	2543	2621	2702	0	0
JD 2444630.5		-212	-223	-233	-239	-243	-245	-244	-241	-80	-97	-117	-138	-157	-175	-192	-206	-218	-226	0	0	0
1981 JAN 26.0		2345	2412	2478	2545	2611	2677	2741	2803	2054	2094	2141	2193	2249	2309	2374	2445	2519	2598	0	0	0
JD 2444620.5		-206	-219	-229	-236	-242	-244	-245	-53	-69	-89	-110	-131	-151	-170	-188	-203	-216	0	0	0	0
1981 JAN 16.0		2323	2388	2454	2520	2584	2648	2711	1984	2020	2064	2112	2164	2220	2282	2348	2420	2496	0	0	0	0
JD 2444610.5		-200	-213	-224	-233	-239	-243	-244	-40	-59	-80	-102	-123	-144	0	-183	-200	0	0	0	0	0
1981 JAN 6.0		2301	2365	2429	2493	2556	2619	2679	1948	1988	2033	2081	2134	2192	0	2323	2395	0	0	0	0	0
JD 2444600.5		-193	-207	-219	-229	-236	-241	-10	-29	-50	-71	-93	-115	-137	-158	-178	0	0	0	0	0	0
1980 DEC 27.0		2278	2341	2404	2466	2528	2588	1876	1914	1955	2001	2050	2105	2164	2228	2297	0	0	0	0	0	0
JD 2444590.5		-187	-201	-214	-224	-232	18	1	-18	-39	-61	-84	-107	-130	-152	0	0	0	0	0	0	0
1980 DEC 17.0		2256	2317	2378	2439	2498	1805	1840	1879	1922	1969	2020	2076	2137	2202	0	0	0	0	0	0	0
JD 2444580.5		-179	-194	-207	-219	-227	32	13	-6	-28	-50	-74	-98	-122	0	0	0	0	0	0	0	0
1980 DEC 7.0		2233	2293	2352	2410	2467	1767	1804	1844	1888	1937	1990	2048	2110	0	0	0	0	0	0	0	0
JD 2444570.5		-171	-187	-201	-212	62	45	26	5	-16	-39	-64	-88	0	0	0	0	0	0	0	0	0
1980 NOV 27.0		2210	2268	2325	2381	1693	1728	1767	1809	1855	1906	1961	2021	0	0	0	0	0	0	0	0	0
JD 2444560.5		-163	-179	-193	-92	76	58	39	18	-4	-28	-53	0	0	0	0	0	0	0	0	0	0
1980 NOV 17.0		2187	2242	2297	1617	1653	1690	1730	1774	1823	1876	1933	0	0	0	0	0	0	0	0	0	0
	(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E11

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

	(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)
JD 2444680.5		-207	-204	-199	-193	-186	-178	-168	-158	-147	-134	-121	-26	-1	48	102	145	175	195	209	218	224
1981 MAR 17.0		3071	3091	3112	3134	3158	3184	3211	3239	3269	3300	3333	3494	3557	83	223	350	455	540	609	665	712
JD 2444670.5		-216	-213	-209	-203	-197	-189	-180	-170	-158	-146	-132	-28	16	71	119	153	177	194	206	214	221
1981 MAR 7.0		3025	3046	3068	3092	3117	3144	3173	3203	3235	3268	3303	3488	1	140	269	376	462	532	589	637	677
JD 2444660.5		-225	-222	-218	-213	-206	-199	-190	-180	-169	-156	-52	-14	40	90	129	156	176	190	201	209	216
1981 FEB 25.0		2979	3001	3025	3050	3077	3106	3136	3168	3201	3236	3425	3523	58	189	298	386	457	515	563	604	640
JD 2444650.5		-231	-229	-225	-221	-215	-208	-199	-190	-179	-74	-43	7	60	102	133	155	172	185	195	202	0
1981 FEB 15.0		2934	2957	2982	3009	3038	3068	3100	3133	3169	3369	3448	3579	110	222	312	384	442	491	532	568	0
JD 2444640.5		-237	-235	-232	-228	-222	-216	-208	-198	-187	-71	-23	29	73	107	132	151	166	177	187	0	0
1981 FEB 5.0		2889	2914	2940	2969	2999	3031	3065	3101	3138	3378	3500	33	148	239	312	372	421	462	498	0	0
JD 2444630.5		-241	-240	-237	-234	-229	-223	-215	-206	-95	-54	-2	44	80	108	128	145	158	168	0	0	0
1981 JAN 26.0		2846	2872	2900	2930	2962	2995	3032	3070	3313	3424	3557	74	168	243	303	352	394	430	0	0	0
JD 2444620.5		-244	-244	-242	-239	-234	-228	-221	-117	-83	-33	13	52	81	104	122	136	148	0	0	0	0
1981 JAN 16.0		2803	2831	2860	2892	2926	2962	3000	3255	3350	3482	2	98	175	236	285	327	364	0	0	0	0
JD 2444610.5		-246	-246	-245	-242	-239	-233	-227	-109	-64	-16	23	54	78	0	113	126	0	0	0	0	0
1981 JAN 6.0		2762	2791	2822	2856	2892	2930	2971	3280	3407	3530	30	108	170	0	263	299	0	0	0	0	0
JD 2444600.5		-247	-248	-247	-245	-242	-237	-133	-93	-46	-5	26	52	72	88	102	0	0	0	0	0	0
1980 DEC 27.0		2723	2754	2787	2822	2860	2901	3215	3333	3458	3562	42	106	157	200	236	0	0	0	0	0	0
JD 2444590.5		-247	-248	-248	-247	-245	-153	-120	-76	-35	-1	25	46	63	78	0	0	0	0	0	0	0
1980 DEC 17.0		2686	2718	2753	2791	2831	3154	3261	3387	3494	3578	43	95	139	175	0	0	0	0	0	0	0
JD 2444580.5		-246	-248	-249	-249	-247	-144	-104	-63	-29	-2	19	38	53	0	0	0	0	0	0	0	0
1980 DEC 7.0		2652	2686	2723	2762	2805	3192	3316	3426	3513	3581	35	79	116	0	0	0	0	0	0	0	0
JD 2444570.5		-245	-247	-249	-249	-165	-130	-91	-56	-28	-6	12	28	0	0	0	0	0	0	0	0	0
1980 NOV 27.0		2620	2656	2695	2737	3126	3245	3359	3450	3520	3575	20	58	0	0	0	0	0	0	0	0	0
JD 2444560.5		-243	-246	-249	-183	-153	-117	-83	-55	-32	-13	2	0	0	0	0	0	0	0	0	0	0
1980 NOV 17.0		2591	2629	2671	3065	3176	3291	3386	3459	3516	3562	1	0	0	0	0	0	0	0	0	0	0
	(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)

JD2444400.5 1980 JUN 10.0

JD2444440.5 1980 JUL 20.0

JD2444480.5 1980 AUG 29.0

JD2444520.5 1980 OCT 8.0

JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E11

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

	(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)
JD 2444680.5 1981 MAR 17.0		2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386
JD 2444670.5 1981 MAR 7.0		2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372
JD 2444660.5 1981 FEB 25.0		2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358
JD 2444650.5 1981 FEB 15.0		2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	0
JD 2444640.5 1981 FEB 5.0		2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	0	0
JD 2444630.5 1981 JAN 26.0		2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	0	0	0
JD 2444620.5 1981 JAN 16.0		2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	0	0	0	0
JD 2444610.5 1981 JAN 6.0		2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	0	2277	2277	0	0	0	0	0	0
JD 2444600.5 1980 DEC 27.0		2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	0	0	0	0	0	0	0
JD 2444590.5 1980 DEC 17.0		2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	0	0	0	0	0	0	0
JD 2444530.5 1980 DEC 7.0		2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	0	0	0	0	0	0	0	0
JD 2444570.5 1980 NOV 27.0		2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	0	0	0	0	0	0	0	0	0
JD 2444560.5 1980 NOV 17.0		2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	0	0	0	0	0	0	0	0	0	0
	(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

M19
E11

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

	(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)
JD 2444680.5		26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
1981 MAR 17.0		37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
JD 2444670.5		42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42
1981 MAR 7.0		58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
JD 2444660.5		57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
1981 FEB 25.0		80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
JD 2444650.5		73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	0
1981 FEB 15.0		102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	0
JD 2444640.5		88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	0	0
1981 FEB 5.0		124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	0	0
JD 2444630.5		104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	0	0	0
1981 JAN 26.0		146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	0	0	0
JD 2444620.5		119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	0	0	0	0
1981 JAN 16.0		169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	0	0	0	0
JD 2444610.5		135	135	135	135	135	135	135	135	135	135	135	135	135	0	135	135	0	0	0	0	0
1981 JAN 6.0		192	192	192	192	192	192	192	192	192	192	192	192	192	0	192	192	0	0	0	0	0
JD 2444600.5		151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	0	0	0	0	0	0
1980 DEC 27.0		216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	0	0	0	0	0	0
JD 2444590.5		166	166	166	166	166	166	166	166	166	166	166	166	166	166	0	0	0	0	0	0	0
1980 DEC 17.0		240	240	240	240	240	240	240	240	240	240	240	240	240	240	0	0	0	0	0	0	0
JD 2444580.5		182	182	182	182	182	182	182	182	182	182	182	182	182	0	0	0	0	0	0	0	0
1980 DEC 7.0		264	264	264	264	264	264	264	264	264	264	264	264	264	0	0	0	0	0	0	0	0
JD 2444570.5		197	197	197	197	197	197	197	197	197	197	197	197	0	0	0	0	0	0	0	0	0
1980 NOV 27.0		289	289	289	289	289	289	289	289	289	289	289	289	0	0	0	0	0	0	0	0	0
JD 2444560.5		212	212	212	212	212	212	212	212	212	212	212	0	0	0	0	0	0	0	0	0	0
1980 NOV 17.0		314	314	314	314	314	314	314	314	314	314	314	0	0	0	0	0	0	0	0	0	0
	(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)

JD2444400.5
1980 JUN 10.0

JD2444440.5
1980 JUL 20.0

JD2444480.5
1980 AUG 29.0

JD2444520.5
1980 OCT 8.0

JD2444560.5
1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E11

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

	(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)
JD 2444680.5		1032	937	841	746	651	555	459	364	267	171	74	3571	3476	3377	3277	3177	3077	2976	2875	2773	2671
1981 MAR 17.0		1148	1211	1272	1333	1393	1453	1512	1572	1631	1692	1753	-1761	-1664	-1601	-1554	-1511	-1470	-1428	-1385	-1342	-1297
JD 2444670.5		970	874	779	684	588	493	397	301	205	108	18	3511	3413	3314	3215	3115	3014	2913	2812	2710	2609
1981 MAR 7.0		1189	1251	1312	1373	1432	1492	1551	1610	1670	1731	1788	-1698	-1626	-1576	-1533	-1491	-1449	-1406	-1363	-1318	-1274
JD 2444660.5		907	811	716	621	525	430	334	238	142	47	3545	3448	3350	3251	3152	3052	2951	2850	2749	2647	2546
1981 FEB 25.0		1230	1291	1352	1412	1471	1531	1590	1649	1709	1770	-1734	-1653	-1599	-1554	-1512	-1470	-1427	-1383	-1339	-1294	-1249
JD 2444650.5		843	748	653	557	462	367	271	175	80	3575	3483	3385	3287	3188	3089	2989	2888	2787	2686	2584	0
1981 FEB 15.0		1270	1331	1391	1451	1510	1569	1629	1688	1749	-1768	-1682	-1622	-1576	-1533	-1490	-1447	-1404	-1359	-1314	-1269	0
JD 2444640.5		780	685	589	494	399	303	208	112	23	3516	3419	3322	3224	3125	3025	2925	2825	2724	2622	0	0
1981 FEB 5.0		1309	1370	1430	1490	1549	1608	1668	1728	1785	-1712	-1646	-1597	-1553	-1510	-1467	-1424	-1379	-1334	-1289	0	0
JD 2444630.5		717	621	526	431	335	240	145	51	3548	3453	3356	3259	3160	3061	2962	2862	2761	2660	0	0	0
1981 JAN 26.0		1348	1409	1469	1528	1587	1647	1707	1767	-1744	-1671	-1618	-1573	-1530	-1487	-1443	-1399	-1354	-1309	0	0	0
JD 2444620.5		653	558	462	367	272	177	82	3576	3486	3390	3293	3195	3097	2998	2898	2798	2698	0	0	0	0
1981 JAN 16.0		1386	1447	1507	1566	1626	1686	1746	-1773	-1697	-1640	-1594	-1550	-1507	-1463	-1419	-1374	-1328	0	0	0	0
JD 2444610.5		590	495	399	304	209	114	25	3519	3424	3327	3230	3132	3034	0	2835	2735	0	0	0	0	0
1981 JAN 6.0		1424	1485	1545	1605	1665	1725	1783	-1725	-1663	-1614	-1570	-1526	-1482	0	-1393	-1348	0	0	0	0	0
JD 2444600.5		527	432	337	241	147	53	3551	3457	3361	3264	3167	3069	2971	2872	2772	0	0	0	0	0	0
1980 DEC 27.0		1461	1522	1583	1643	1704	1765	-1753	-1687	-1635	-1590	-1546	-1502	-1458	-1413	-1367	0	0	0	0	0	0
JD 2444590.5		465	370	274	179	85	3578	3490	3395	3299	3202	3105	3007	2909	2810	0	0	0	0	0	0	0
1980 DEC 17.0		1499	1560	1621	1682	1743	-1779	-1711	-1657	-1610	-1565	-1521	-1477	-1432	-1387	0	0	0	0	0	0	0
JD 2444580.5		403	308	213	118	28	3524	3429	3333	3237	3140	3043	2945	2847	0	0	0	0	0	0	0	0
1980 DEC 7.0		1535	1597	1659	1721	1781	-1737	-1679	-1630	-1585	-1540	-1496	-1452	-1406	0	0	0	0	0	0	0	0
JD 2444570.5		342	247	152	58	3557	3464	3368	3273	3176	3079	2982	2884	0	0	0	0	0	0	0	0	0
1980 NOV 27.0		1572	1634	1697	1760	-1764	-1702	-1651	-1605	-1560	-1516	-1471	-1426	0	0	0	0	0	0	0	0	0
JD 2444560.5		282	187	92	3584	3499	3404	3308	3212	3116	3019	2922	0	0	0	0	0	0	0	0	0	0
1980 NOV 17.0		1609	1672	1736	-1786	-1726	-1673	-1625	-1580	-1535	-1491	-1445	0	0	0	0	0	0	0	0	0	0
	(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E11

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

	(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)
JD 2444680.5		139	135	136	140	149	164	188	228	301	461	1057	2816	628	356	253	201	171	152	142	136	135
1981 MAR 17.0		563	608	657	707	758	809	858	904	944	975	995	995	935	873	839	828	836	860	901	960	1043
JD 2444670.5		149	148	151	159	173	195	232	295	424	790	5580	961	463	310	238	198	174	159	151	148	150
1981 MAR 7.0		588	636	685	736	788	838	886	929	964	989	1000	962	897	856	840	843	864	900	956	1033	1139
JD 2444660.5		159	161	168	180	201	234	289	395	650	1975	1678	610	378	279	226	195	176	165	160	160	165
1981 FEB 25.0		615	664	715	767	818	868	913	952	982	998	984	922	875	853	852	869	902	952	1024	1123	1259
JD 2444650.5		170	175	186	204	234	283	371	561	1224	4184	832	461	325	256	217	193	178	171	169	172	0
1981 FEB 15.0		643	694	746	798	849	896	938	972	994	996	947	896	868	863	875	904	950	1017	1109	1235	0
JD 2444640.5		180	189	206	232	275	349	497	907	5043	1212	569	378	288	239	209	191	180	176	178	0	0
1981 FEB 5.0		672	724	777	829	878	923	961	988	999	970	917	884	874	882	907	949	1011	1096	1214	0	0
JD 2444630.5		191	205	228	266	328	446	728	2092	2035	717	439	323	261	224	202	189	182	182	0	0	0
1981 JAN 26.0		702	755	808	859	907	948	979	997	988	939	902	887	891	912	950	1006	1085	1194	0	0	0
JD 2444620.5		203	223	255	308	403	608	1299	4920	938	515	361	284	239	212	196	187	184	0	0	0	0
1981 JAN 16.0		732	786	839	889	933	969	993	997	960	920	900	900	917	951	1003	1076	1176	0	0	0	0
JD 2444610.5		216	243	288	366	519	938	4747	1321	611	404	307	254	221	0	190	185	0	0	0	0	0
1981 JAN 6.0		763	817	869	917	957	986	999	978	938	914	910	923	953	0	1067	1160	0	0	0	0	0
JD 2444600.5		231	268	331	449	727	2021	2184	744	453	332	268	230	206	192	185	0	0	0	0	0	0
1980 DEC 27.0		794	848	899	943	977	997	992	956	929	921	930	956	998	1060	1146	0	0	0	0	0	0
JD 2444590.5		248	299	390	585	1225	5534	949	514	358	281	236	209	192	183	0	0	0	0	0	0	0
1980 DEC 17.0		826	879	926	965	991	998	973	944	932	938	959	997	1054	1132	0	0	0	0	0	0	0
JD 2444580.5		269	340	480	854	3922	1324	593	388	294	242	211	191	180	0	0	0	0	0	0	0	0
1980 DEC 7.0		856	907	951	983	999	986	959	944	945	963	997	1048	1120	0	0	0	0	0	0	0	0
JD 2444570.5		296	399	636	1668	2273	708	423	308	247	211	189	175	0	0	0	0	0	0	0	0	0
1980 NOV 27.0		886	934	972	996	996	973	956	954	967	997	1043	1108	0	0	0	0	0	0	0	0	0
JD 2444560.5		332	491	986	7339	896	468	322	251	210	185	169	0	0	0	0	0	0	0	0	0	0
1980 NOV 17.0		915	958	989	999	985	967	962	972	997	1038	1097	0	0	0	0	0	0	0	0	0	0
	(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E11

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

	(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)
JD 2444680.5		-495	-432	-369	-306	-245	-187	-134	-88	-49	-21	-3	4	47	95	128	149	161	167	168	166	160
1981 MAR 17.0		1774	1780	1784	1785	1783	1778	1769	1756	1739	1716	1688	1428	1398	-1402	-1459	-1578	-1795	-2212	-3214	-8172	-9999
JD 2444670.5		-457	-393	-330	-268	-209	-154	-104	-63	-30	-8	0	27	75	111	134	148	155	157	155	150	141
1981 MAR 7.0		1765	1769	1771	1771	1767	1759	1748	1732	1711	1685	1654	1397	-1392	-1438	-1545	-1743	-2121	-3003	-6832	-9999	-9999
JD 2444660.5		-417	-354	-291	-230	-174	-122	-77	-41	-15	-1	11	56	95	120	135	144	147	145	141	132	121
1981 FEB 25.0		1755	1758	1758	1755	1749	1739	1725	1706	1682	1652	1398	-1385	-1421	-1516	-1698	-2044	-2832	-5937	-9999	-9999	-9999
JD 2444650.5		-378	-315	-253	-194	-141	-93	-53	-23	-4	3	37	78	105	122	132	136	135	131	124	113	0
1981 FEB 15.0		1745	1746	1744	1739	1730	1717	1700	1678	1651	1398	-1382	-1407	-1492	-1660	-1979	-2693	-5304	-9999	-9999	-9999	0
JD 2444640.5		-339	-276	-216	-160	-110	-67	-32	-9	0	21	61	90	109	120	125	126	122	115	105	0	0
1981 FEB 5.0		1734	1733	1729	1722	1710	1695	1674	1649	1618	1382	-1398	-1473	-1628	-1924	-2579	-4841	-9999	-9999	-9999	0	0
JD 2444630.5		-301	-239	-181	-128	-82	-44	-16	-1	9	44	76	96	109	115	116	113	107	98	0	0	0
1981 JAN 26.0		1722	1719	1713	1703	1689	1670	1647	1618	1383	-1392	-1457	-1601	-1879	-2485	-4491	-9999	-9999	-9999	0	0	0
JD 2444620.5		-263	-203	-147	-98	-56	-25	-5	2	29	61	83	97	104	106	104	99	90	0	0	0	0
1981 JAN 16.0		1709	1704	1696	1683	1666	1645	1618	1386	-1390	-1446	-1579	-1840	-2408	-4224	-9999	-9999	-9999	0	0	0	0
JD 2444610.5		-227	-169	-116	-71	-35	-10	-0	15	46	70	85	93	97	0	91	83	0	0	0	0	0
1981 JAN 6.0		1695	1688	1677	1662	1643	1618	1588	-1390	-1438	-1561	-1808	-2345	-4018	0	-9999	-9999	0	0	0	0	0
JD 2444600.5		-192	-136	-87	-47	-18	-2	6	32	57	73	83	87	87	83	76	0	0	0	0	0	0
1980 DEC 27.0		1681	1671	1658	1640	1617	1590	-1393	-1434	-1547	-1782	-2293	-3857	-9999	-9999	-9999	0	0	0	0	0	0
JD 2444590.5		-158	-106	-62	-28	-6	1	20	44	62	72	78	78	75	69	0	0	0	0	0	0	0
1980 DEC 17.0		1665	1653	1638	1617	1591	-1399	-1433	-1538	-1762	-2251	-3731	-9999	-9999	-9999	0	0	0	0	0	0	0
JD 2444580.5		-127	-78	-39	-12	-0	10	32	50	62	68	70	68	63	0	0	0	0	0	0	0	0
1980 DEC 7.0		1649	1635	1616	1593	1565	-1436	-1532	-1746	-2218	-3635	-9999	-9999	-9999	0	0	0	0	0	0	0	0
JD 2444570.5		-98	-54	-21	-3	3	21	39	52	59	62	61	56	0	0	0	0	0	0	0	0	0
1980 NOV 27.0		1631	1615	1594	1568	-1443	-1531	-1736	-2193	-3562	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0
JD 2444560.5		-71	-33	-8	0	12	29	42	51	54	54	50	0	0	0	0	0	0	0	0	0	0
1980 NOV 17.0		1613	1594	1571	-1454	-1535	-1730	-2175	-3511	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0
	(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E11

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)
JD 2444680.5	119	114	109	105	100	97	93	90	87	84	81	4267	1169	813	686	618	575	542	516	494	475
1981 MAR 17.0	180	173	167	160	154	147	142	136	130	125	120	267	259	248	237	225	212	199	186	173	159
JD 2444670.5	115	110	106	102	97	94	90	87	84	82	79	1544	916	739	656	605	569	540	517	498	481
1981 MAR 7.0	175	168	161	154	148	142	136	131	125	120	115	260	250	239	227	214	201	188	175	161	147
JD 2444660.5	112	107	103	98	95	91	88	85	82	79	2382	1067	807	700	639	598	567	543	523	507	494
1981 FEB 25.0	169	162	155	149	143	137	131	126	120	115	261	252	240	228	216	203	190	177	163	149	134
JD 2444650.5	108	104	99	95	92	88	85	82	79	5082	1309	896	752	677	630	596	570	549	533	522	0
1981 FEB 15.0	163	156	150	143	137	132	126	121	115	262	253	242	230	218	205	192	179	165	150	136	0
JD 2444640.5	105	100	96	92	89	85	82	79	77	1751	1018	816	722	666	628	600	578	562	551	0	0
1981 FEB 5.0	157	151	144	138	132	126	121	115	110	254	244	232	220	207	194	180	167	152	137	0	0
JD 2444630.5	101	97	93	89	86	83	80	77	2746	1200	899	776	708	663	632	609	593	583	0	0	0
1981 JAN 26.0	151	145	138	132	127	121	115	110	255	245	234	221	209	196	182	168	154	139	0	0	0
JD 2444620.5	98	94	90	86	83	80	77	5833	1494	1008	841	756	704	668	643	627	618	0	0	0	0
1981 JAN 16.0	145	139	133	127	121	115	110	255	246	235	223	210	197	184	170	155	140	0	0	0	0
JD 2444610.5	94	90	87	83	80	77	74	2041	1163	923	813	750	709	0	664	655	0	0	0	0	0
1981 JAN 6.0	140	133	127	121	116	110	105	247	236	224	212	199	185	0	157	142	0	0	0	0	0
JD 2444600.5	91	87	83	80	77	74	3317	1397	1030	882	803	755	724	704	697	0	0	0	0	0	0
1980 DEC 27.0	134	128	121	116	110	104	247	237	226	213	200	187	173	158	143	0	0	0	0	0	0
JD 2444590.5	88	84	80	77	74	7528	1788	1177	969	867	808	771	750	742	0	0	0	0	0	0	0
1980 DEC 17.0	128	122	116	110	104	248	238	227	215	202	188	174	160	145	0	0	0	0	0	0	0
JD 2444580.5	84	80	77	74	71	2549	1389	1081	944	869	825	801	792	0	0	0	0	0	0	0	0
1980 DEC 7.0	122	116	110	104	99	239	228	216	203	189	176	161	146	0	0	0	0	0	0	0	0
JD 2444570.5	81	77	73	70	4521	1721	1231	1040	943	888	858	849	0	0	0	0	0	0	0	0	0
1980 NOV 27.0	116	110	104	99	239	229	217	204	192	177	162	147	0	0	0	0	0	0	0	0	0
JD 2444560.5	77	73	70	9999	2305	1442	1163	1032	961	924	912	0	0	0	0	0	0	0	0	0	0
1980 NOV 17.0	110	104	98	239	229	218	205	192	178	163	148	0	0	0	0	0	0	0	0	0	0

(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19 E11

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)
JD 2444680.5 1981 MAR 17.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444670.5 1981 MAR 7.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444660.5 1981 FEB 25.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772
JD 2444650.5 1981 FEB 15.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0
JD 2444640.5 1981 FEB 5.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0
JD 2444630.5 1981 JAN 26.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0
JD 2444620.5 1981 JAN 16.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0
JD 2444610.5 1981 JAN 6.0	772	772	772	772	772	772	772	772	772	772	772	772	772	0	772	772	0	0	0	0	0
JD 2444600.5 1980 DEC 27.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0
JD 2444590.5 1980 DEC 17.0	772	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0
JD 2444580.5 1980 DEC 7.0	772	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0
JD 2444570.5 1980 NOV 27.0	772	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0
JD 2444560.5 1980 NOV 17.0	772	772	772	772	772	772	772	772	772	772	772	0	0	0	0	0	0	0	0	0	0

(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)

JD2444400.5 1980 JUN 10.0 | JD2444440.5 1980 JUL 20.0 | JD2444480.5 1980 AUG 29.0 | JD2444520.5 1980 OCT 8.0 | JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

M19
E11

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)
JD 2444680.5	1286	1428	1582	1747	1923	2111	2309	2518	2738	2967	3206	2942	2393	2121	2049	2102	2245	2470	2781	3192	3731
1981 MAR 17.0	1222	1325	1435	1554	1682	1817	1961	2113	2273	2442	2619	2268	1733	1471	1434	1548	1767	2073	2463	2950	3562
JD 2444670.5	1362	1510	1669	1841	2023	2217	2421	2636	2862	3098	3344	2551	2202	2087	2116	2246	2462	2767	3173	3709	4423
1981 MAR 7.0	1262	1370	1487	1611	1745	1887	2037	2196	2364	2541	2727	1901	1563	1482	1573	1780	2078	2464	2948	3557	4340
JD 2444660.5	1440	1595	1761	1938	2127	2327	2538	2760	2992	3236	2735	2304	2136	2138	2253	2459	2757	3159	3690	4400	5370
1981 FEB 25.0	1302	1416	1539	1670	1810	1959	2116	2283	2459	2645	2087	1673	1539	1602	1796	2087	2469	2951	3557	4338	5373
JD 2444650.5	1522	1683	1856	2040	2235	2442	2660	2889	3129	2937	2429	2200	2169	2266	2462	2752	3148	3676	4383	5348	0
1981 FEB 15.0	1344	1464	1593	1730	1877	2033	2198	2373	2558	2285	1801	1606	1638	1816	2100	2478	2957	3562	4341	5374	0
JD 2444640.5	1608	1776	1955	2146	2348	2562	2788	3025	3274	2579	2281	2211	2287	2470	2752	3143	3667	4370	5333	0	0
1981 FEB 5.0	1386	1512	1648	1792	1946	2110	2283	2468	2664	1947	1686	1681	1841	2116	2489	2966	3570	4348	5380	0	0
JD 2444630.5	1697	1872	2058	2256	2466	2688	2922	3169	2750	2382	2265	2316	2485	2759	3144	3663	4363	5323	0	0	0
1981 JAN 26.0	1429	1562	1704	1856	2018	2190	2373	2568	2109	1780	1730	1869	2135	2504	2979	3582	4359	5391	0	0	0
JD 2444620.5	1789	1971	2165	2371	2590	2820	3064	2936	2503	2333	2354	2507	2771	3150	3664	4362	5320	0	0	0	0
1981 JAN 16.0	1473	1613	1762	1922	2092	2274	2468	2280	1889	1788	1902	2157	2521	2994	3597	4375	5407	0	0	0	0
JD 2444610.5	1886	2075	2277	2492	2719	2960	3215	2645	2417	2404	2537	2790	3162	0	4366	5323	0	0	0	0	0
1981 JAN 6.0	1519	1665	1822	1991	2171	2364	2571	2014	1857	1940	2181	2540	3012	0	4394	5427	0	0	0	0	0
JD 2444600.5	1986	2184	2394	2618	2856	3109	2805	2519	2465	2576	2816	3180	3687	4377	5332	0	0	0	0	0	0
1980 DEC 27.0	1565	1720	1886	2064	2255	2461	2151	1937	1984	2209	2561	3032	3636	4415	5452	0	0	0	0	0	0
JD 2444590.5	2090	2297	2517	2752	3002	2977	2638	2539	2624	2849	3204	3706	4394	5348	0	0	0	0	0	0	0
1980 DEC 17.0	1614	1777	1953	2142	2347	2296	2029	2035	2239	2584	3052	3657	4439	5479	0	0	0	0	0	0	0
JD 2444580.5	2198	2415	2647	2894	3158	2774	2628	2682	2889	3235	3731	4416	5370	0	0	0	0	0	0	0	0
1980 DEC 7.0	1665	1838	2025	2228	2448	2134	2094	2274	2609	3074	3680	4465	5509	0	0	0	0	0	0	0	0
JD 2444570.5	2312	2541	2785	3046	2924	2730	2751	2938	3272	3762	4444	5398	0	0	0	0	0	0	0	0	0
1980 NOV 27.0	1720	1904	2104	2323	2249	2162	2314	2636	3097	3704	4491	5541	0	0	0	0	0	0	0	0	0
JD 2444560.5	2432	2674	2933	3084	2848	2831	2995	3315	3798	4477	5431	0	0	0	0	0	0	0	0	0	0
1980 NOV 17.0	1780	1977	2193	2370	2240	2358	2665	3122	3728	4519	5574	0	0	0	0	0	0	0	0	0	0
(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)

JD2444400.5	JD2444440.5	JD2444480.5	JD2444520.5	JD2444560.5
1980 JUN 10.0	1980 JUL 20.0	1980 AUG 29.0	1980 OCT 8.0	1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE — EARTH - MARS TRAJECTORY PARAMETERS — M19 E11

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

	(FLT T)	(280)	(270)	(260)	(250)	(240)	(230)	(220)	(210)	(200)	(190)	(180)	(170)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)
JD 2444680.5		2508	2753	3017	3301	3605	3928	4270	4631	5011	5409	5825	5211	4126	3592	3484	3650	4013	4543	5243	6142	7293
1981 MAR 17.0		1032	937	841	746	651	555	459	364	267	171	74	3571	3476	3377	3277	3177	3077	2976	2875	2773	2671
JD 2444670.5		2623	2880	3156	3452	3768	4104	4459	4833	5226	5639	6071	4452	3766	3569	3689	4026	4540	5230	6122	7266	8763
1981 MAR 7.0		970	874	779	684	588	493	397	301	205	108	18	3511	3413	3314	3215	3115	3014	2913	2812	2710	2609
JD 2444660.5		2743	3011	3300	3608	3937	4286	4654	5043	5451	5880	4822	3977	3675	3740	4049	4547	5226	6109	7248	8738	9999
1981 FEB 25.0		907	811	716	621	525	430	334	238	142	47	3545	3448	3350	3251	3152	3052	2951	2850	2749	2647	2546
JD 2444650.5		2866	3147	3449	3770	4113	4475	4858	5262	5688	5222	4230	3807	3808	4082	4562	5230	6105	7238	8723	9999	0
1981 FEB 15.0		843	748	653	557	462	367	271	175	80	3575	3483	3385	3287	3188	3089	2989	2888	2787	2686	2584	0
JD 2444640.5		2994	3288	3602	3938	4294	4672	5071	5493	5938	4526	3968	3892	4127	4586	5242	6110	7237	8718	9999	0	0
1981 FEB 5.0		780	685	589	494	399	303	208	112	23	3516	3419	3322	3224	3125	3025	2925	2825	2724	2622	0	0
JD 2444630.5		3126	3433	3762	4112	4484	4878	5295	5737	4859	4162	3995	4185	4620	5262	6123	7245	8722	9999	0	0	0
1981 JAN 26.0		717	621	526	431	335	240	145	51	3548	3453	3356	3259	3160	3061	2962	2862	2761	2660	0	0	0
JD 2444620.5		3263	3584	3928	4293	4682	5094	5532	5216	4392	4122	4257	4664	5292	6144	7261	8736	9999	0	0	0	0
1981 JAN 16.0		653	558	462	367	272	177	82	3576	3486	3390	3293	3195	3097	2998	2898	2798	2698	0	0	0	0
JD 2444610.5		3404	3740	4100	4483	4890	5324	5786	4659	4274	4344	4718	5330	6174	0	8760	9999	0	0	0	0	0
1981 JAN 6.0		590	495	399	304	209	114	25	3519	3424	3327	3230	3132	3034	0	2835	2735	0	0	0	0	0
JD 2444600.5		3551	3903	4280	4682	5111	5570	4956	4455	4449	4785	5377	6211	7322	8792	9999	0	0	0	0	0	0
1980 DEC 27.0		527	432	337	241	147	53	3551	3457	3361	3264	3167	3069	2971	2872	2772	0	0	0	0	0	0
JD 2444590.5		3704	4074	4470	4894	5348	5273	4667	4574	4863	5433	6256	7363	8833	9999	0	0	0	0	0	0	0
1980 DEC 17.0		465	370	274	179	85	3578	3490	3395	3299	3202	3105	3007	2909	2810	0	0	0	0	0	0	0
JD 2444580.5		3864	4254	4672	5121	5606	4908	4721	4956	5499	6309	7411	8881	9999	0	0	0	0	0	0	0	0
1980 DEC 7.0		403	308	213	118	28	3524	3429	3333	3237	3140	3043	2945	2847	0	0	0	0	0	0	0	0
JD 2444570.5		4033	4445	4889	5369	5173	4892	5064	5574	6369	7466	8935	9999	0	0	0	0	0	0	0	0	0
1980 NOV 27.0		342	247	152	58	3557	3464	3368	3273	3176	3079	2982	2884	0	0	0	0	0	0	0	0	0
JD 2444560.5		4213	4651	5126	5454	5088	5189	5660	6437	7526	8996	9999	0	0	0	0	0	0	0	0	0	0
1980 NOV 17.0		282	187	92	3584	3499	3404	3308	3212	3116	3019	2922	0	0	0	0	0	0	0	0	0	0
	(FLT T)	(160)	(150)	(140)	(130)	(120)	(110)	(100)	(90)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)

JD2444400.5 1980 JUN 10.0 — JD2444440.5 1980 JUL 20.0 — JD2444480.5 1980 AUG 29.0 — JD2444520.5 1980 OCT 8.0 — JD2444560.5 1980 NOV 17.0

EARTH DEPARTURE OR ARRIVAL DATE

M19
E12

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444680.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671707	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.617	DEGREES
MEAN ANOM. AT EPOCH	=	71.872	DEGREES
DATE OF NODAL PASSAGE	=	2444870.621	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444680.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338811	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.413	DEGREES
ARG. OF PERIHELION	=	286.301	DEGREES
MEAN ANOM. AT EPOCH	=	22.246	DEGREES
DATE OF NODAL PASSAGE	=	2444759.492	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.066	DEGREES

M19
E12

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)
JD 2444680.5	1467	1714	2049	0	0	0	0	0	0	0	0	0	0	0	2055	1720	1472	1282	1134	1018	927
1981 MAR 17.0	1295	1560	1911	0	0	0	0	0	0	0	0	0	0	0	2028	1677	1410	1201	1031	891	773
JD 2444670.5	1705	2038	0	0	0	0	0	0	0	0	0	0	0	0	2045	1711	1464	1274	1126	1009	917	847
1981 MAR 7.0	1558	1908	0	0	0	0	0	0	0	0	0	0	0	0	2016	1667	1402	1194	1025	886	770	672
JD 2444660.5	2029	0	0	0	0	0	0	0	0	0	0	0	0	0	2035	1703	1456	1267	1119	1002	909	838	785
1981 FEB 25.0	1906	0	0	0	0	0	0	0	0	0	0	0	0	0	2004	1657	1393	1186	1019	881	766	669	589
JD 2444650.5	0	0	0	0	0	0	0	0	0	0	0	0	0	2027	1696	1450	1260	1113	996	902	830	776	740
1981 FEB 15.0	0	0	0	0	0	0	0	0	0	0	0	0	0	1993	1647	1385	1179	1013	876	761	665	585	522
JD 2444640.5	0	0	0	0	0	0	0	0	0	0	0	0	2021	1690	1444	1256	1108	990	897	823	768	729	710
1981 FEB 5.0	0	0	0	0	0	0	0	0	0	0	0	0	1982	1637	1376	1171	1006	870	756	660	580	517	473
JD 2444630.5	0	0	0	0	0	0	0	0	0	0	2015	1685	1440	1252	1104	987	893	818	761	721	698	698
1981 JAN 26.0	0	0	0	0	0	0	0	0	0	0	1971	1628	1368	1164	1000	864	751	655	576	512	466	444
JD 2444620.5	0	0	0	0	0	0	0	0	0	2010	1682	1437	1249	1101	984	890	815	756	714	688	682	705
1981 JAN 16.0	0	0	0	0	0	0	0	0	0	1962	1619	1360	1157	993	859	746	651	571	507	459	434	442
JD 2444610.5	0	0	0	0	0	0	0	0	2007	1679	1435	1247	1100	982	888	812	753	709	680	670	685	738
1981 JAN 6.0	0	0	0	0	0	0	0	0	1954	1612	1353	1151	988	853	741	646	567	502	453	424	425	471
JD 2444600.5	0	0	0	0	0	0	2004	1677	1434	1246	1099	981	887	811	751	705	675	661	669	709	805
1980 DEC 27.0	0	0	0	0	0	0	1946	1605	1347	1145	983	848	736	642	563	497	447	416	411	445	538
JD 2444590.5	0	0	0	0	0	2002	1676	1433	1246	1099	981	887	810	749	703	671	653	656	686	763	918
1980 DEC 17.0	0	0	0	0	0	1940	1600	1342	1140	978	844	732	638	559	493	442	408	398	423	498	648
JD 2444580.5	0	0	0	0	2001	1676	1433	1247	1100	982	887	811	749	702	668	648	646	668	728	854	1081
1980 DEC 7.0	0	0	0	0	1935	1595	1338	1137	975	841	729	635	555	489	437	401	387	403	464	588	798
JD 2444570.5	0	0	0	2000	1675	1434	1247	1101	984	889	812	750	702	666	644	638	653	701	802	991	1276
1980 NOV 27.0	0	0	0	1931	1592	1335	1134	972	838	727	632	552	486	422	395	376	386	434	537	717	967
JD 2444560.5	0	0	2002	1675	1434	1249	1103	986	891	813	751	702	666	642	632	642	679	760	915	1170	1332
1980 NOV 17.0	0	0	1930	1589	1333	1132	970	837	725	630	550	483	429	389	367	371	408	493	645	873	1053

(FLT T)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E12

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(LO)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)
JD 2444680.5	-209	-195	-177	0	0	0	0	0	0	0	0	0	0	0	-168	-190	-208	-222	-233	-240	-243
1981 MAR 17.0	2944	3025	3105	0	0	0	0	0	0	0	0	0	0	0	2227	2305	2383	2461	2540	2617	2694
JD 2444670.5	-212	-199	0	0	0	0	0	0	0	0	0	0	0	-141	-166	-188	-206	-221	-233	-241	-246
1981 MAR 7.0	2926	3008	0	0	0	0	0	0	0	0	0	0	0	2137	2213	2290	2367	2445	2522	2599	2676
JD 2444660.5	-215	0	0	0	0	0	0	0	0	0	0	0	0	-111	-138	-163	-185	-205	-221	-233	-242	-248
1981 FEB 25.0	2908	0	0	0	0	0	0	0	0	0	0	0	0	2049	2124	2199	2275	2351	2428	2504	2581	2657
JD 2444650.5	0	0	0	0	0	0	0	0	0	0	0	0	-78	-107	-135	-160	-183	-203	-220	-233	-244	-251
1981 FEB 15.0	0	0	0	0	0	0	0	0	0	0	0	0	1963	2036	2111	2185	2260	2335	2411	2487	2563	2639
JD 2444640.5	0	0	0	0	0	0	0	0	0	0	0	-44	-74	-104	-132	-157	-181	-201	-219	-234	-245	-254
1981 FEB 5.0	0	0	0	0	0	0	0	0	0	0	0	1877	1951	2024	2097	2171	2245	2319	2394	2469	2545	2622
JD 2444630.5	0	0	0	0	0	0	0	0	0	-9	-40	-70	-100	-128	-154	-178	-200	-218	-234	-247	-257
1981 JAN 26.0	0	0	0	0	0	0	0	0	0	1792	1866	1938	2011	2083	2156	2229	2303	2377	2452	2529	2606
JD 2444620.5	0	0	0	0	0	0	0	0	25	-5	-36	-67	-96	-125	-152	-176	-198	-218	-235	-249	-260
1981 JAN 16.0	0	0	0	0	0	0	0	0	1707	1781	1854	1926	1998	2070	2142	2214	2287	2361	2437	2514	2592
JD 2444610.5	0	0	0	0	0	0	0	58	29	-1	-32	-63	-93	-122	-149	-174	-197	-217	-235	-250	-262
1981 JAN 6.0	0	0	0	0	0	0	0	1621	1696	1770	1842	1914	1985	2056	2128	2200	2272	2346	2422	2499	2577
JD 2444600.5	0	0	0	0	0	0	89	63	33	3	-28	-59	-89	-118	-146	-171	-195	-217	-236	-251	-263
1980 DEC 27.0	0	0	0	0	0	0	1534	1610	1685	1758	1831	1902	1973	2043	2114	2186	2259	2333	2409	2486	2558
JD 2444590.5	0	0	0	0	0	117	95	67	36	7	-24	-55	-85	-115	-143	-169	-194	-216	-236	-251	-260
1980 DEC 17.0	0	0	0	0	0	1444	1523	1600	1675	1747	1819	1890	1961	2031	2101	2173	2246	2320	2396	2470	2529
JD 2444580.5	0	0	0	0	140	123	99	71	42	11	-20	-51	-82	-111	-140	-167	-192	-215	-234	-248	-253
1980 DEC 7.0	0	0	0	0	1353	1435	1513	1590	1664	1737	1808	1879	1949	2019	2090	2161	2234	2309	2383	2448	2484
JD 2444570.5	0	0	0	155	148	128	103	76	46	15	-16	-47	-78	-108	-137	-165	-190	-213	-231	-241	-239
1980 NOV 27.0	0	0	0	1259	1344	1425	1503	1580	165[illegible]	1726	1798	1868	1938	2008	2079	2151	2224	2297	2365	2412	2422
JD 2444560.5	0	0	158	167	153	133	108	80	50	19	-12	-43	-74	-105	-134	-162	-188	-209	-224	-227	98
1980 NOV 17.0	0	0	1161	1251	1335	1415	1494	1570	1644	1717	1788	1858	1928	1998	2069	2141	2214	2283	2338	2361	1587
(FLT T)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

M19
E12

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	80	70	60	50	40	30	20	10	0	10	20	30	40	50	60	70	80	90	100	110	120
JD 2444680.5	224	229	232	0	0	0	0	0	0	0	0	0	0	0	-230	-228	-225	-221	-215	-208	-197
1981 MAR 17.0	712	752	787	0	0	0	0	0	0	0	0	0	0	0	2873	2900	2931	2965	3004	3050	3104
JD 2444670.5	221	226	0	0	0	0	0	0	0	0	0	0	0	0	-236	-234	-233	-230	-227	-221	-213	-201
1981 MAR 7.0	677	713	0	0	0	0	0	0	0	0	0	0	0	0	2801	2829	2859	2894	2933	2978	3032	3097
JD 2444660.5	216	0	0	0	0	0	0	0	0	0	0	0	0	-237	-238	-238	-237	-235	-232	-226	-217	-203
1981 FEB 25.0	640	0	0	0	0	0	0	0	0	0	0	0	0	2728	2756	2786	2820	2859	2904	2957	3022	3101
JD 2444650.5	0	0	0	0	0	0	0	0	0	0	0	0	-236	-237	-239	-239	-239	-238	-235	-230	-220	-202
1981 FEB 15.0	0	0	0	0	0	0	0	0	0	0	0	0	2654	2682	2712	2746	2785	2829	2882	2945	3023	3120
JD 2444640.5	0	0	0	0	0	0	0	0	0	0	0	-230	-233	-236	-238	-240	-241	-241	-238	-232	-220	-196
1981 FEB 5.0	0	0	0	0	0	0	0	0	0	0	0	2580	2608	2638	2672	2710	2754	2805	2868	2944	3039	3156
JD 2444630.5	0	0	0	0	0	0	0	0	0	-221	-225	-230	-234	-237	-240	-242	-243	-240	-233	-216	-185	
1981 JAN 26.0	0	0	0	0	0	0	0	0	0	2507	2534	2564	2597	2634	2678	2728	2789	2864	2957	3072	3209	
JD 2444620.5	0	0	0	0	0	0	0	0	-208	-214	-220	-225	-230	-235	-240	-243	-244	-241	-231	-207	-168	
1981 JAN 16.0	0	0	0	0	0	0	0	0	2434	2461	2490	2523	2559	2602	2651	2711	2783	2874	2987	3122	3273	
JD 2444610.5	0	0	0	0	0	0	0	-191	-199	-206	-213	-220	-227	-233	-239	-244	-245	-240	-224	-193	-148	
1981 JAN 6.0	0	0	0	0	0	0	0	2363	2389	2418	2449	2485	2526	2574	2632	2703	2791	2901	3035	3186	3334	
JD 2444600.5	0	0	0	0	0	0	-172	-181	-189	-198	-206	-214	-223	-231	-239	-245	-245	-237	-213	-175	-133	
1980 DEC 27.0	0	0	0	0	0	0	2293	2319	2346	2377	2412	2452	2499	2554	2623	2708	2815	2946	3096	3249	3376	
JD 2444590.5	0	0	0	0	0	-149	-160	-170	-179	-189	-199	-209	-219	-230	-239	-245	-244	-229	-198	-159	-129	
1980 DEC 17.0	0	0	0	0	0	2225	2250	2277	2307	2340	2379	2424	2478	2544	2625	2728	2856	3005	3161	3297	3385	
JD 2444580.5	0	0	0	0	-123	-137	-148	-158	-169	-180	-192	-204	-217	-230	-241	-245	-239	-216	-183	-152	-139	
1980 DEC 7.0	0	0	0	0	2160	2183	2209	2238	2270	2307	2351	2402	2465	2544	2643	2766	2913	3070	3214	3317	3352	
JD 2444570.5	0	0	0	-93	-111	-123	-135	-147	-159	-171	-185	-200	-216	-231	-242	-243	-230	-203	-173	-156	-162	
1980 NOV 27.0	0	0	0	2097	2118	2143	2171	2202	2238	2279	2329	2389	2464	2558	2677	2820	2978	3127	3243	3300	3280	
JD 2444560.5	0	0	-57	-82	-97	-110	-122	-135	-149	-164	-181	-199	-217	-233	-242	-238	-219	-193	-173	-173	-119	
1980 NOV 17.0	0	0	2040	2055	2078	2105	2136	2170	2210	2257	2314	2385	2475	2588	2727	2884	3038	3164	3239	3244	3294	

(FLT T) 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

M19
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MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)
JD 2444680.5 1981 MAR 17.0	2386	2386	2386	0	0	0	0	0	0	0	0	0	0	0	2386	2386	2386	2386	2386	2386	2386
JD 2444670.5 1981 MAR 7.0	2372	2372	0	0	0	0	0	0	0	0	0	0	0	0	2372	2372	2372	2372	2372	2372	2372
JD 2444660.5 1981 FEB 25.0	2358	0	0	0	0	0	0	0	0	0	0	0	0	0	2358	2358	2358	2358	2358	2358	2358
JD 2444650.5 1981 FEB 15.0	0	0	0	0	0	0	0	0	0	0	0	0	0	2344	2344	2344	2344	2344	2344	2344	2344
JD 2444640.5 1981 FEB 5.0	0	0	0	0	0	0	0	0	0	0	0	0	2328	2328	2328	2328	2328	2328	2328	2328	2328
JD 2444630.5 1981 JAN 26.0	0	0	0	0	0	0	0	0	0	0	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312
JD 2444620.5 1981 JAN 16.0	0	0	0	0	0	0	0	0	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295
JD 2444610.5 1981 JAN 6.0	0	0	0	0	0	0	0	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277
JD 2444600.5 1980 DEC 27.0	0	0	0	0	0	0	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258
JD 2444590.5 1980 DEC 17.0	0	0	0	0	0	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238
JD 2444580.5 1980 DEC 7.0	0	0	0	0	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217
JD 2444570.5 1980 NOV 27.0	0	0	0	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194
JD 2444560.5 1980 NOV 17.0	0	0	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169

(FLT T)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E12

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	80	70	60	50	40	30	20	10	0	10	20	30	40	50	60	70	80	90	100	110	120
JD 2444680.5	26	26	26	0	0	0	0	0	0	0	0	0	0	0	26	26	26	26	26	26	26
1981 MAR 17.0	37	37	37	0	0	0	0	0	0	0	0	0	0	0	37	37	37	37	37	37	37
JD 2444670.5	42	42	0	0	0	0	0	0	0	0	0	0	0	42	42	42	42	42	42	42	42
1981 MAR 7.0	58	58	0	0	0	0	0	0	0	0	0	0	0	58	58	58	58	58	58	58	58
JD 2444660.5	57	C	0	0	0	0	0	0	0	0	0	0	57	57	57	57	57	57	57	57	57
1981 FEB 25.0	80	0	0	0	0	0	0	0	0	0	0	0	80	80	80	80	80	80	80	80	80
JD 2444650.5	0	0	0	0	0	0	0	0	0	0	0	73	73	73	73	73	73	73	73	73	73
1981 FEB 15.0	0	0	0	0	0	0	0	0	0	0	0	102	102	102	102	102	102	102	102	102	102
JD 2444640.5	0	0	0	0	0	0	0	0	0	0	88	88	88	88	88	88	88	88	88	88	88
1981 FEB 5.0	0	0	0	0	0	0	0	0	0	0	124	124	124	124	124	124	124	124	124	124	124
JD 2444630.5	0	0	0	0	0	0	0	0	0	104	104	104	104	104	104	104	104	104	104	104	104
1981 JAN 26.0	0	0	0	0	0	0	0	0	0	146	146	146	146	146	146	146	146	146	146	146	146
JD 2444620.5	0	0	0	0	0	0	0	0	119	119	119	119	119	119	119	119	119	119	119	119	119
1981 JAN 16.0	0	0	0	0	0	0	0	0	169	169	169	169	169	169	169	169	169	169	169	169	169
JD 2444610.5	0	0	0	0	0	0	0	135	135	135	135	135	135	135	135	135	135	135	135	135	135
1981 JAN 6.0	0	0	0	0	0	0	0	192	192	192	192	192	192	192	192	192	192	192	192	192	192
JD 2444600.5	0	0	0	0	0	0	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151
1980 DEC 27.0	0	0	0	0	0	0	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216
JD 2444590.5	0	0	0	0	0	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166
1980 DEC 17.0	0	0	0	0	0	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240
JD 2444580.5	0	0	0	0	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182
1980 DEC 7.0	0	0	0	0	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264
JD 2444570.5	0	0	0	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197
1980 NOV 27.0	0	0	0	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289
JD 2444560.5	0	0	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
1980 NOV 17.0	0	0	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314

(FLT T)	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M19 E12

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

	(FLT T)	80	70	60	50	40	30	20	10	0	10	20	30	40	50	60	70	80	90	100	110	120
JD 2444680.5		2671	2569	2467												2326	2422	2518	2613	2709	2804	2899
1981 MAR 17.0		-1297	-1253	-1208												-1187	-1240	-1294	-1348	-1403	-1458	-1514
JD 2444670.5		2609	2507													2292	2388	2484	2580	2676	2771	2866	2962
1981 MAR 7.0		-1274	-1228													-1171	-1224	-1278	-1332	-1387	-1442	-1499	-1556
JD 2444660.5		2546														2258	2355	2451	2547	2643	2739	2834	2929	3025
1981 FEB 25.0		-1249														-1155	-1209	-1262	-1317	-1371	-1427	-1483	-1541	-1599
JD 2444650.5																2223	2321	2418	2514	2611	2706	2802	2897	2993	3088
1981 FEB 15.0																-1139	-1193	-1247	-1301	-1356	-1412	-1468	-1525	-1584	-1644
JD 2444640.5															2189	2287	2384	2481	2578	2674	2770	2865	2961	3056	3151
1981 FEB 5.0															-1123	-1177	-1231	-1286	-1341	-1397	-1453	-1510	-1569	-1629	-1690
JD 2444630.5														2154	2252	2350	2448	2545	2641	2737	2833	2929	3024	3119	3215
1981 JAN 26.0														-1107	-1161	-1216	-1271	-1326	-1382	-1438	-1495	-1554	-1614	-1675	-1737
JD 2444620.5													2118	2217	2316	2414	2511	2608	2705	2801	2897	2992	3088	3183	3278
1981 JAN 16.0													-1090	-1145	-1200	-1255	-1311	-1367	-1423	-1481	-1539	-1599	-1660	-1722	-1783
JD 2444610.5												2081	2181	2280	2379	2477	2574	2671	2768	2864	2960	3055	3151	3246	3341
1981 JAN 6.0												-1074	-1129	-1184	-1240	-1295	-1352	-1408	-1466	-1524	-1584	-1645	-1707	-1769	1773
JD 2444600.5											2044	2144	2244	2343	2441	2539	2637	2734	2831	2927	3023	3118	3213	3309	3404
1980 DEC 27.0											-1057	-1112	-1168	-1224	-1280	-1336	-1393	-1451	-1510	-1569	-1630	-1692	-1754	1785	1739
JD 2444590.5										2006	2106	2206	2306	2405	2504	2602	2699	2796	2893	2989	3085	3180	3276	3371	3466
1980 DEC 17.0										-1040	-1095	-1151	-1207	-1264	-1321	-1378	-1436	-1495	-1554	-1615	-1677	-1739	1799	1747	1724
JD 2444580.5									1966	2067	2168	2268	2368	2467	2565	2663	2761	2858	2955	3051	3147	3242	3337	3432	3526
1980 DEC 7.0									-1022	-1078	-1134	-1191	-1248	-1305	-1362	-1421	-1479	-1539	-1600	-1662	-1724	-1786	1758	1723	1740
JD 2444570.5								1926	2027	2128	2229	2329	2429	2528	2626	2725	2822	2919	3016	3112	3208	3303	3398	3493	3580
1980 NOV 27.0								-1004	-1060	-1117	-1174	-1231	-1288	-1346	-1405	-1464	-1524	-1584	-1646	-1709	-1771	1770	1727	1724	1781
JD 2444560.5					1885	1986	2087	2188	2289	2389	2489	2588	2687	2785	2882	2979	3076	3172	3268	3363	3458	3552	52		
1980 NOV 17.0					-986	-1042	-1099	-1156	-1214	-1272	-1330	-1389	-1448	-1508	-1569	-1631	-1693	-1755	1784	1736	1716	1756	1780		
	(FLT T)	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

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MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	80	70	60	50	40	30	20	10	0	10	20	30	40	50	60	70	80	90	100	110	120
JD 2444680.5	135	139	147	0	0	0	0	0	0	0	0	0	0	0	170	153	142	137	135	137	144
1981 MAR 17.0	1043	1157	1316	0	0	0	0	0	0	0	0	0	0	0	1447	1245	1100	994	914	854	810
JD 2444670.5	150	157	0	0	0	0	0	0	0	0	0	0	0	0	196	173	159	151	148	149	155	165
1981 MAR 7.0	1139	1286	0	0	0	0	0	0	0	0	0	0	0	0	1475	1261	1109	997	913	851	804	772
JD 2444660.5	165	0	0	0	0	0	0	0	0	0	0	0	0	222	193	176	165	160	160	164	173	189
1981 FEB 25.0	1259	0	0	0	0	0	0	0	0	0	0	0	0	1504	1278	1118	1001	914	848	799	765	743
JD 2444650.5	0	0	0	0	0	0	0	0	0	0	0	0	251	214	191	178	171	169	171	179	193	216
1981 FEB 15.0	0	0	0	0	0	0	0	0	0	0	0	0	1536	1296	1128	1006	915	846	795	758	734	722
JD 2444640.5	0	0	0	0	0	0	0	0	0	0	281	234	207	190	180	176	177	184	196	217	250
1981 FEB 5.0	0	0	0	0	0	0	0	0	0	0	1570	1316	1140	1012	916	845	791	752	726	711	711
JD 2444630.5	0	0	0	0	0	0	0	0	0	313	255	221	200	188	182	182	186	197	215	244	291
1981 JAN 26.0	0	0	0	0	0	0	0	0	0	1607	1338	1152	1018	919	844	788	747	718	702	698	710
JD 2444620.5	0	0	0	0	0	0	0	0	350	277	235	210	195	187	184	187	196	211	236	277	346
1981 JAN 16.0	0	0	0	0	0	0	0	0	1648	1362	1166	1026	923	845	786	743	712	694	687	695	722
JD 2444610.5	0	0	0	0	0	0	0	393	300	249	218	200	190	185	186	193	206	227	262	319	424
1981 JAN 6.0	0	0	0	0	0	0	0	1692	1388	1182	1035	927	846	785	740	707	686	677	681	703	751
JD 2444600.5	0	0	0	0	0	0	445	325	262	226	204	191	185	184	188	199	217	246	294	377	547
1980 DEC 27.0	0	0	0	0	0	0	1741	1418	1200	1046	933	849	785	737	703	680	669	670	686	726	801
JD 2444590.5	0	0	0	0	0	513	353	276	233	207	191	182	180	182	190	205	230	269	335	462	776
1980 DEC 17.0	0	0	0	0	0	1794	1450	1220	1058	940	852	786	736	700	675	661	659	672	705	768	873
JD 2444580.5	0	0	0	0	609	388	291	239	208	190	179	174	175	181	193	213	245	298	393	604	1372
1980 DEC 7.0	0	0	0	0	1854	1486	1242	1072	948	857	787	735	697	670	655	650	659	686	740	832	951
JD 2444570.5	0	0	0	765	431	307	245	209	187	174	168	167	170	179	195	221	263	336	483	899	5800
1980 NOV 27.0	0	0	0	1918	1526	1267	1088	958	862	790	735	695	667	649	642	648	670	714	794	910	996
JD 2444560.5	0	0	1069	493	327	250	208	183	168	160	157	159	165	178	198	231	287	391	643	1908	1748
1980 NOV 17.0	0	0	1989	1569	1295	1106	970	869	793	736	694	664	644	635	638	655	693	760	867	978	998

(FLT T)	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E12

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	80	70	60	50	40	30	20	10	0	10	20	30	40	50	60	70	80	90	100	110	120
JD 2444680.5	160	150	138	0	0	0	0	0	0	0	0	0	0	0	173	187	199	209	216	220	221
1981 MAR 17.0	-9999	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-4790	-2795	-2113
JD 2444670.5	141	129	0	0	0	0	0	0	0	0	0	0	0	183	198	210	220	227	232	234	232
1981 MAR 7.0	-9999	-9999	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-5017	-2872	-2155	-1805
JD 2444660.5	121	0	0	0	0	0	0	0	0	0	0	0	0	194	208	221	231	238	243	246	245	240
1981 FEB 25.0	-9999	0	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-5279	-2956	-2200	-1834	-1625
JD 2444650.5	0	0	0	0	0	0	0	0	0	0	0	0	205	219	231	241	249	255	258	257	253	244
1981 FEB 15.0	0	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-5590	-3051	-2250	-1866	-1647	-1513
JD 2444640.5	0	0	0	0	0	0	0	0	0	0	0	216	230	242	252	260	266	269	269	266	258	244
1981 FEB 5.0	0	0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-5966	-3160	-2306	-1901	-1671	-1530	-1442
JD 2444630.5	0	0	0	0	0	0	0	0	0	0	228	242	254	263	271	277	280	281	278	272	259	238
1981 JAN 26.0	0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-6431	-3284	-2368	-1940	-1699	-1550	-1456	-1401	
JD 2444620.5	0	0	0	0	0	0	0	0	0	240	254	265	275	282	288	292	293	291	285	273	254	223
1981 JAN 16.0	0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-7020	-3428	-2439	-1984	-1729	-1572	-1472	-1411	-1384	
JD 2444610.5	0	0	0	0	0	0	0	253	266	277	286	294	300	303	304	303	297	287	270	243	198	
1981 JAN 6.0	0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-7787	-3598	-2520	-2034	-1764	-1597	-1491	-1424	-1390	1392	
JD 2444600.5	0	0	0	0	0	0	267	279	289	298	306	311	315	316	314	310	300	285	260	221	157	
1980 DEC 27.0	0	0	0	0	0	0	-9999	-9999	-9999	-9999	-8827	-3799	-2612	-2090	-1802	-1626	-1512	-1440	-1400	1393	1423	
JD 2444590.5	0	0	0	0	0	282	293	302	311	318	323	326	327	326	322	313	300	277	242	186	101	
1980 DEC 17.0	0	0	0	0	0	-9999	-9999	-9999	-9999	-9999	-4041	-2718	-2153	-1845	-1657	-1536	-1458	-1412	1397	1417	1481	
JD 2444580.5	0	0	0	0	298	307	316	324	330	335	338	339	338	334	326	313	293	262	212	135	39	
1980 DEC 7.0	0	0	0	-9999	-9999	-9999	-9999	-9999	-4333	-2841	-2224	-1893	-1692	-1563	-1478	-1427	-1404	1415	1467	1557		
JD 2444570.5	0	0	0	314	322	330	337	343	348	350	352	350	346	339	327	309	280	236	167	72	3	
1980 NOV 27.0	0	0	-9999	-9999	-9999	-9999	-9999	-4692	-2931	-2305	-1947	-1732	-1593	-1501	-1444	-1415	1417	1456	1538	1621		
~~JD 2444560.5~~	0	0	332	339	345	351	357	361	363	364	363	359	352	341	324	298	258	198	109	18	-1	
1980 NOV 17.0	0	0	-9999	-9999	-9999	-9999	-9999	-5138	-3150	-2397	-2008	-1775	-1626	-1527	-1464	-1429	1423	1450	1520	1615	1907	
(FLT T)	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E12

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	80	70	60	50	40	30	20	10	0	10	20	30	40	50	60	70	80	90	100	110	120
JD 2444680.5	475	458	443	0	0	0	0	0	0	0	0	0	0	0	363	379	395	411	427	445	465
1981 MAR 17.0	159	145	130	0	0	0	0	0	0	0	0	0	0	0	123	137	151	164	177	190	202
JD 2444670.5	481	467	0	0	0	0	0	0	0	0	0	0	0	346	362	379	395	412	429	448	469
1981 MAR 7.0	147	132	0	0	0	0	0	0	0	0	0	0	0	121	135	149	163	176	188	201	213
JD 2444660.5	494	0	0	0	0	0	0	0	0	0	0	0	329	347	364	380	397	414	432	452	475
1981 FEB 25.0	134	0	0	0	0	0	0	0	0	0	0	0	119	134	148	161	174	187	199	211	223
JD 2444650.5	0	0	0	0	0	0	0	0	0	0	0	313	332	350	367	383	400	418	437	458	483
1981 FEB 15.0	0	0	0	0	0	0	0	0	0	0	0	117	132	146	159	172	185	197	209	221	233
JD 2444640.5	0	0	0	0	0	0	0	0	0	0	298	318	336	353	370	387	405	423	443	466	495
1981 FEB 5.0	0	0	0	0	0	0	0	0	0	0	116	130	144	157	170	183	195	208	219	231	243
JD 2444630.5	0	0	0	0	0	0	0	0	0	283	304	323	341	358	375	392	410	430	451	477	512
1981 JAN 26.0	0	0	0	0	0	0	0	0	0	114	128	142	156	169	181	194	206	218	229	241	252
JD 2444620.5	0	0	0	0	0	0	0	0	269	291	310	328	346	363	380	398	417	437	461	492	536
1981 JAN 16.0	0	0	0	0	0	0	0	0	112	126	140	154	167	179	192	204	216	227	239	250	262
JD 2444610.5	0	0	0	0	0	0	0	256	278	298	316	334	351	368	386	404	424	447	474	512	576
1981 JAN 6.0	0	0	0	0	0	0	0	110	124	138	152	165	177	190	202	214	226	237	248	260	270
JD 2444600.5	0	0	0	0	0	0	242	265	285	304	322	340	357	374	392	412	433	458	492	544	649
1980 DEC 27.0	0	0	0	0	0	0	108	122	136	150	163	175	188	200	212	224	235	246	258	269	279
JD 2444590.5	0	0	0	0	0	229	252	273	293	311	329	346	363	381	400	420	444	474	517	597	810
1980 DEC 17.0	0	0	0	0	0	106	120	134	148	161	173	186	198	210	221	233	244	256	267	277	287
JD 2444580.5	0	0	0	0	217	240	261	281	300	317	335	352	370	388	408	430	458	495	558	701	1299
1980 DEC 7.0	0	0	0	0	103	118	132	145	158	171	183	196	208	219	231	242	253	264	275	285	293
JD 2444570.5	0	0	0	204	228	250	269	288	306	324	341	359	377	396	417	443	476	527	629	954	4573
1980 NOV 27.0	0	0	0	101	116	129	143	156	169	181	193	205	217	229	240	251	262	273	283	292	299
JD 2444560.5	0	0	192	216	238	258	277	295	313	330	348	366	384	405	429	458	501	579	779	1931	91
1980 NOV 17.0	0	0	99	113	127	141	154	166	179	191	203	215	226	238	249	260	271	281	291	298	146

(FLT T)	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE — EARTH - MARS TRAJECTORY PARAMETERS — M19 E12

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	80	70	60	50	40	30	20	10	0	10	20	30	40	50	60	70	80	90	100	110	120
JD 2444680.5 1981 MAR 17.0	772	772	772	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524
JD 2444670.5 1981 MAR 7.0	772	772	0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524
JD 2444660.5 1981 FEB 25.0	772	0	0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524
JD 2444650.5 1981 FEB 15.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524
JD 2444640.5 1981 FEB 5.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524
JD 2444630.5 1981 JAN 26.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524
JD 2444620.5 1981 JAN 16.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524
JD 2444610.5 1981 JAN 6.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524
JD 2444600.5 1980 DEC 27.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524
JD 2444590.5 1980 DEC 17.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524
JD 2444580.5 1980 DEC 7.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524
JD 2444570.5 1980 NOV 27.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524
JD 2444560.5 1980 NOV 17.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1524	1524	1524	1524	1524	1524	1524

(FLT T)	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240
JD2444600.5 1980 DEC 27.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD2444640.5 1981 FEB 5.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD2444680.5 1981 MAR 17.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD2444720.5 1981 APR 26.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD2444760.5 1981 JUN 5.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E12

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(80)	(70)	(60)	(50)	(40)	(30)	(20)	(10)	(0)	(10)	(20)	(30)	(40)	(50)	(60)	(70)	(80)	(90)	(100)	(110)	(120)
JD 2444680.5	3731	4450	5428	0	0	0	0	0	0	0	0	0	0	0	4696	3719	2998	2453	2031	1703	1451
1981 MAR 17.0	3562	4348	5390	0	0	0	0	0	0	0	0	0	0	0	5736	4693	3903	3284	2782	2370	2027
JD 2444670.5	4423	5397	0	0	0	0	0	0	0	0	0	0	0	0	4666	3692	2974	2430	2008	1679	1425	1232
1981 MAR 7.0	4340	5379	0	0	0	0	0	0	0	0	0	0	0	0	5700	4663	3878	3263	2766	2357	2016	1732
JD 2444660.5	5370	0	0	0	0	0	0	0	0	0	0	0	0	4639	3668	2952	2408	1988	1659	1402	1206	1064
1981 FEB 25.0	5373	0	0	0	0	0	0	0	0	0	0	0	0	5666	4634	3853	3241	2748	2342	2004	1721	1490
JD 2444650.5	0	0	0	0	0	0	0	0	0	0	0	0	4616	3648	2934	2390	1971	1642	1384	1185	1038	943
1981 FEB 15.0	0	0	0	0	0	0	0	0	0	0	0	0	5631	4604	3827	3218	2729	2326	1990	1710	1478	1298
JD 2444640.5	0	0	0	0	0	0	0	0	0	0	0	0	4596	3631	2918	2377	1957	1627	1368	1167	1017	914	864
1981 FEB 5.0	0	0	0	0	0	0	0	0	0	0	0	0	5599	4576	3802	3197	2710	2309	1976	1697	1466	1283	1158
JD 2444630.5	0	0	0	0	0	0	0	0	0	0	4579	3617	2906	2366	1947	1617	1357	1153	1000	891	832	831
1981 JAN 26.0	0	0	0	0	0	0	0	0	0	0	5568	4548	3778	3175	2691	2292	1961	1683	1453	1269	1138	1078
JD 2444620.5	0	0	0	0	0	0	0	0	0	4566	3606	2897	2358	1939	1609	1348	1143	987	874	806	791	851
1981 JAN 16.0	0	0	0	0	0	0	0	0	0	5540	4523	3756	3155	2672	2276	1946	1670	1440	1255	1120	1048	1071
JD 2444610.5	0	0	0	0	0	0	0	0	4556	3599	2891	2353	1934	1604	1343	1137	977	860	786	759	797	938
1981 JAN 6.0	0	0	0	0	0	0	0	0	5515	4501	3735	3136	2656	2260	1932	1656	1427	1241	1102	1021	1024	1154
JD 2444600.5	0	0	0	0	0	0	0	4548	3593	2888	2350	1932	1602	1340	1133	971	851	771	735	755	862	1119
1980 DEC 27.0	0	0	0	0	0	0	0	5493	4481	3717	3120	2641	2246	1919	1644	1415	1228	1086	997	984	1080	1345
JD 2444590.5	0	0	0	0	0	0	4542	3590	2886	2350	1933	1602	1340	1131	968	845	760	716	722	801	1003	1427
1980 DEC 17.0	0	0	0	0	0	0	5475	4465	3702	3106	2627	2234	1907	1633	1404	1216	1071	976	948	1017	1230	1662
JD 2444580.5	0	0	0	0	4538	3589	2887	2351	1935	1605	1342	1133	968	842	753	702	696	753	912	1251	1881
1980 DEC 7.0	0	0	0	0	5460	4451	3690	3094	2617	2224	1897	1623	1394	1205	1057	956	917	963	1133	1489	2098
JD 2444570.5	0	0	0	4536	3587	2888	2353	1938	1609	1346	1136	970	842	749	692	677	716	839	1109	1630	2434
1980 NOV 27.0	0	0	0	5449	4441	3681	3086	2609	2217	1890	1616	1385	1195	1045	939	889	915	1049	1342	1861	2593
JD 2444560.5	0	0	4541	3586	2889	2357	1943	1614	1351	1140	973	843	747	686	662	686	781	995	1418	2132	2595
1980 NOV 17.0	0	0	5446	4434	3674	3081	2604	2212	1885	1610	1379	1187	1034	923	864	873	977	1217	1652	2318	2848

(FLT T)(40)(50)(60)(70)(80)(90)(100)(110)(120)(130)(140)(150)(160)(170)(180)(190)(200)(210)(220)(230)(240)

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

M19
E12

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	80	70	60	50	40	30	20	10	0	10	20	30	40	50	60	70	80	90	100	110	120
JD 2444680.5	7293	8798	9999	0	0	0	0	0	0	0	0	0	0	0	9999	8412	6901	5736	4813	4073	3477
1981 MAR 17.0	2671	2569	2467	0	0	0	0	0	0	0	0	0	0	0	2326	2422	2518	2613	2709	2804	2899
JD 2444670.5	8763	9999	0	0	0	0	0	0	0	0	0	0	0	9999	8355	6852	5693	4774	4036	3441	2964
1981 MAR 7.0	2609	2507	0	0	0	0	0	0	0	0	0	0	0	2292	2388	2484	2580	2676	2771	2866	2962
JD 2444660.5	9999	0	0	0	0	0	0	0	0	0	0	0	0	9999	8302	6805	5649	4736	4001	3406	2928	2554
1981 FEB 25.0	2546	0	0	0	0	0	0	0	0	0	0	0	0	2258	2355	2451	2547	2643	2739	2834	2929	3025
JD 2444650.5	0	0	0	0	0	0	0	0	0	0	0	0	9999	8252	6761	5609	4700	3967	3374	2894	2516	2240
1981 FEB 15.0	0	0	0	0	0	0	0	0	0	0	0	0	2223	2321	2418	2514	2611	2706	2802	2897	2993	3088
JD 2444640.5	0	0	0	0	0	0	0	0	0	0	0	9999	8206	6721	5573	4667	3937	3344	2864	2483	2198	2022
1981 FEB 5.0	0	0	0	0	0	0	0	0	0	0	0	2189	2287	2384	2481	2578	2674	2770	2865	2961	3056	3151
JD 2444630.5	0	0	0	0	0	0	0	0	0	0	9999	8165	6684	5541	4637	3909	3317	2837	2453	2161	1970	1909
1981 JAN 26.0	0	0	0	0	0	0	0	0	0	0	2154	2252	2350	2448	2545	2641	2737	2833	2929	3024	3119	3215
JD 2444620.5	0	0	0	0	0	0	0	0	0	9999	8130	6653	5513	4611	3885	3294	2813	2426	2129	1926	1839	1921
1981 JAN 16.0	0	0	0	0	0	0	0	0	0	2118	2217	2316	2414	2511	2608	2705	2801	2897	2992	3088	3183	3278
JD 2444610.5	0	0	0	0	0	0	0	9999	8100	6626	5489	4590	3864	3274	2793	2404	2102	1888	1781	1821	2092
1981 JAN 6.0	0	0	0	0	0	0	0	2081	2181	2280	2379	2477	2574	2671	2768	2864	2960	3055	3151	3246	3341
JD 2444600.5	0	0	0	0	0	0	9999	8075	6605	5470	4573	3848	3259	2777	2386	2079	1857	1732	1739	1941	2464
1980 DEC 27.0	0	0	0	0	0	0	2044	2144	2244	2343	2441	2539	2637	2734	2831	2927	3023	3118	3213	3309	3404
JD 2444590.5	0	0	0	0	0	9999	8055	6589	5455	4550	3837	3247	2764	2372	2061	1831	1692	1670	1818	2233	3088
1980 DEC 17.0	0	0	0	0	0	2006	2106	2206	2306	2405	2504	2602	2699	2796	2893	2989	3085	3180	3276	3371	3466
JD 2444580.5	0	0	0	0	9998	8040	6577	5445	4552	3829	3239	2756	2362	2047	1810	1659	1613	1716	2044	2739	3980
1980 DEC 7.0	0	0	0	0	1966	2067	2168	2268	2368	2467	2565	2663	2761	2858	2955	3051	3147	3242	3337	3432	3526
JD 2444570.5	0	0	0	9986	8028	6568	5439	4547	3825	3236	2751	2355	2037	1794	1631	1565	1631	1888	2450	3491	5027
1980 NOV 27.0	0	0	0	1926	2027	2128	2229	2329	2429	2528	2626	2725	2822	2919	3016	3112	3208	3303	3398	3493	3580
JD 2444560.5	0	0	9987	8020	6563	5438	4547	3825	3236	2750	2352	2031	1781	1609	1525	1559	1759	2212	3069	4449	5443
1980 NOV 17.0	0	0	1885	1986	2087	2188	2289	2389	2489	2588	2687	2785	2882	2979	3076	3172	3268	3363	3458	3552	52

(FLT T) 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240

JD2444600.5 1980 DEC 27.0 | JD2444640.5 1981 FEB 5.0 | JD2444680.5 1981 MAR 17.0 | JD2444720.5 1981 APR 26.0 | JD2444760.5 1981 JUN 5.0

EARTH DEPARTURE OR ARRIVAL DATE

M19
E13

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444780.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671695	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.622	DEGREES
MEAN ANOM. AT EPOCH	=	170.432	DEGREES
DATE OF NODAL PASSAGE	=	2444870.617	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444780.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338836	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.415	DEGREES
ARG. OF PERIHELION	=	286.303	DEGREES
MEAN ANOM. AT EPOCH	=	74.648	DEGREES
DATE OF NODAL PASSAGE	=	2444759.489	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.067	DEGREES

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E13

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
JD 2444680.5	927	858	811	788	795	849	983	1220	1289	1214	1141	1070	1000	931	865	800	738	679	622	568	516
1981 MAR 17.0	773	675	596	538	511	536	647	858	965	904	845	788	733	680	630	582	537	495	456	420	387
JD 2444670.5	847	797	769	767	805	910	1119	1316	1243	1170	1099	1029	961	894	829	767	707	649	594	542	493
1981 MAR 7.0	672	592	532	499	509	593	779	1000	940	881	824	768	715	665	616	571	527	487	449	415	383
JD 2444660.5	785	753	744	769	850	1025	1343	1270	1198	1127	1057	989	922	858	795	734	676	620	567	517	470
1981 FEB 25.0	589	527	489	488	549	705	1034	974	915	858	803	749	698	649	603	559	517	479	443	410	380
JD 2444650.5	740	725	740	802	943	1196	1297	1225	1154	1085	1016	950	885	822	761	702	646	592	541	492	447
1981 FEB 15.0	522	480	471	514	640	869	1006	947	890	835	782	731	681	634	589	547	508	471	436	405	377
JD 2444640.5	710	717	762	875	1095	1323	1252	1181	1112	1043	977	911	848	787	727	670	616	564	514	468	426
1981 FEB 5.0	473	456	485	585	786	1036	978	921	866	813	761	712	664	619	576	536	498	463	430	401	376
JD 2444630.5	698	730	819	1003	1291	1278	1207	1138	1070	1003	938	874	812	752	695	639	587	536	489	445	408
1981 JAN 26.0	444	461	540	710	968	1006	950	896	842	791	741	693	647	604	563	524	488	455	424	397	375
JD 2444620.5	705	774	924	1186	1304	1234	1164	1096	1029	963	899	837	777	719	663	609	558	509	464	424	400
1981 JAN 16.0	442	502	643	882	1033	977	923	870	819	769	721	675	631	589	550	513	478	447	418	394	381
JD 2444610.5	738	859	1086	1331	1260	1191	1122	1055	989	925	862	801	742	686	631	579	530	483	441	408	434
1981 JAN 6.0	471	586	796	1058	1003	949	896	845	795	747	701	656	614	574	537	501	469	439	413	393	412
JD 2444600.5	805	995	1286	1287	1218	1149	1081	1015	950	887	826	766	709	654	601	550	503	458	420	405	1050
1980 DEC 27.0	538	718	977	1026	973	920	869	820	772	725	681	638	598	559	524	490	460	432	409	400	858
JD 2444590.5	918	1181	1315	1245	1176	1108	1041	976	912	850	790	732	676	622	571	522	476	435	405	494	473
1980 DEC 17.0	648	886	1048	995	943	892	843	795	748	704	661	620	581	545	511	479	450	425	407	462	457
JD 2444580.5	1081	1343	1273	1204	1135	1068	1002	938	875	815	756	699	644	592	542	495	451	414	413	1091	329
1980 DEC 7.0	798	1068	1016	964	914	865	817	770	725	682	641	602	565	531	498	469	442	420	417	898	377
JD 2444570.5	1276	1302	1232	1163	1096	1029	964	901	839	780	722	667	613	562	514	468	428	401	623	385	284
1980 NOV 27.0	967	1035	984	934	885	837	791	746	703	661	622	585	550	517	486	458	434	417	550	416	361
JD 2444560.5	1332	1262	1192	1124	1057	991	927	865	805	746	690	635	583	534	487	443	407	421	596	306	255
1980 NOV 17.0	1053	1003	953	904	857	810	765	722	681	641	603	568	534	503	474	448	427	431	553	379	355
(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E13

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

	(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
JD 2444680.5		-243	-243	-240	-233	-224	-213	-201	-192	-182	-196	-207	-215	-221	-223	-222	-216	-207	-194	-177	-156	-130
1981 MAR 17.0		2695	2770	2845	2919	2991	3061	3119	3149	2327	2392	2458	2527	2598	2671	2744	2818	2891	2964	3035	3103	3169
JD 2444670.5		-246	-247	-245	-240	-232	-222	-213	-159	-175	-190	-202	-212	-218	-221	-220	-216	-207	-194	-176	-154	-126
1981 MAR 7.0		2676	2752	2827	2902	2975	3040	3082	2241	2303	2368	2435	2505	2577	2650	2723	2798	2872	2945	3016	3084	3149
JD 2444660.5		-248	-251	-250	-246	-240	-232	-132	-151	-168	-184	-197	-208	-215	-219	-218	-214	-206	-192	-174	-151	-119
1981 FEB 25.0		2657	2733	2810	2885	2956	3009	2156	2217	2280	2345	2413	2483	2555	2629	2703	2778	2852	2925	2996	3064	3127
JD 2444650.5		-251	-255	-256	-253	-248	-242	-124	-143	-162	-178	-192	-203	-211	-216	-216	-212	-204	-190	-171	-145	-108
1981 FEB 15.0		2639	2716	2793	2868	2930	2958	2133	2194	2257	2323	2391	2462	2534	2608	2682	2757	2832	2905	2975	3042	3104
JD 2444640.5		-254	-259	-261	-259	-255	-94	-115	-136	-155	-172	-187	-199	-207	-212	-213	-210	-201	-187	-166	-136	-89
1981 FEB 5.0		2622	2700	2777	2847	2888	2050	2110	2171	2235	2301	2370	2441	2513	2587	2662	2737	2812	2884	2954	3020	3079
JD 2444630.5		-257	-263	-266	-264	-260	-84	-107	-128	-148	-165	-181	-194	-203	-209	-210	-207	-198	-182	-158	-121	-54
1981 JAN 26.0		2606	2685	2759	2812	2824	2028	2088	2150	2214	2280	2349	2420	2493	2567	2642	2717	2791	2863	2932	2996	3051
JD 2444620.5		-260	-267	-269	-267	-52	-75	-98	-120	-140	-159	-175	-189	-199	-205	-206	-203	-193	-176	-147	-96	12
1981 JAN 16.0		2592	2668	2731	2756	1947	2006	2066	2129	2193	2260	2329	2399	2472	2546	2621	2696	2770	2842	2910	2971	3021
JD 2444610.5		-262	-269	-269	-18	-43	-67	-90	-112	-133	-152	-169	-183	-194	-200	-202	-198	-187	-166	-128	-53	168
1981 JAN 6.0		2577	2645	2685	1868	1925	1985	2045	2108	2173	2240	2308	2379	2452	2526	2601	2675	2749	2820	2886	2944	2994
JD 2444600.5		-263	-267	-264	-9	-34	-58	-82	-105	-126	-146	-163	-178	-189	-195	-197	-192	-179	-152	-99	34	533
1980 DEC 27.0		2558	2609	2618	1846	1904	1964	2025	2088	2153	2220	2289	2359	2432	2506	2580	2654	2727	2797	2862	2918	3274
JD 2444590.5		-260	-261	24	-0	-25	-49	-74	-97	-119	-139	-157	-172	-183	-190	-191	-185	-168	-131	-46	253	-663
1980 DEC 17.0		2529	2552	1767	1825	1884	1944	2005	2069	2133	2200	2269	2340	2412	2485	2559	2633	2705	2774	2838	2921	3389
JD 2444580.5		-253	57	33	8	-16	-41	-66	-89	-112	-132	-151	-166	-177	-184	-184	-176	-152	-98	65	-534	-519
1980 DEC 7.0		2484	1688	1746	1804	1864	1924	1986	2049	2114	2181	2250	2320	2392	2465	2539	2612	2683	2751	2821	322	3045
JD 2444570.5		-239	66	41	16	-8	-33	-58	-82	-105	-124	-144	-160	-171	-177	-176	-164	-130	-37	358	-621	-442
1980 NOV 27.0		2422	1667	1725	1785	1844	1905	1967	2031	2095	2162	2230	2301	2372	2445	2517	2590	2661	2731	2901	3013	2949
JD 2444560.5		98	74	50	25	-0	-25	-50	-74	-98	-119	-138	-153	-164	-170	-166	-148	-94	100	-753	-485	-402
1980 NOV 17.0		1587	1646	1705	1765	1825	1886	1949	2012	2077	2143	2211	2281	2352	2424	2496	2568	2640	2729	3437	2855	2881
	(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)

JD2444800.5	JD2444840.5	JD2444880.5	JD2444920.5	JD2444960.5
1981 JUL 15.0	1981 AUG 24.0	1981 OCT 3.0	1981 NOV 12.0	1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E13

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
JD 2444680.5	-197	-182	-160	-126	-78	-18	37	64	143	153	162	169	175	180	184	186	187	187	185	181	174
1981 MAR 17.0	3104	3171	3253	3358	3487	31	155	205	332	363	393	423	450	477	502	526	549	570	590	608	625
JD 2444670.5	-201	-183	-155	-113	-56	2	39	121	132	141	150	157	164	169	173	175	176	176	173	168	159
1981 MAR 7.0	3097	3178	3279	3405	3548	83	159	268	299	329	358	385	412	437	461	484	506	526	545	563	580
JD 2444660.5	-203	-181	-145	-93	-34	11	97	108	119	129	137	145	151	156	160	162	163	162	159	152	141
1981 FEB 25.0	3101	3200	3322	3465	7	105	204	235	265	293	321	347	372	396	419	441	462	481	500	517	534
JD 2444650.5	-202	-173	-127	-71	-20	2	83	95	105	115	123	131	137	142	146	148	149	148	143	134	118
1981 FEB 15.0	3120	3239	3380	3526	42	79	172	201	230	257	283	308	332	355	377	398	418	437	455	472	490
JD 2444640.5	-196	-158	-106	-53	-22	57	69	81	91	100	109	116	122	127	131	133	133	131	125	113	89
1981 FEB 5.0	3156	3295	3444	3572	34	110	139	167	194	220	244	268	291	313	334	354	374	392	410	428	446
JD 2444630.5	-185	-138	-86	-48	-42	43	55	66	76	85	93	101	107	112	115	117	116	113	104	87	50
1981 JAN 26.0	3209	3360	3496	3581	3578	76	104	131	157	182	205	228	250	271	292	311	329	347	365	384	406
JD 2444620.5	-168	-118	-76	-62	15	28	39	50	60	69	77	84	90	95	98	99	98	92	80	55	-11
1981 JAN 16.0	3273	3417	3519	3542	14	42	69	95	119	143	166	188	209	229	249	267	285	303	322	343	371
JD 2444610.5	-148	-105	-83	-11	0	12	24	34	44	53	61	67	73	78	80	81	78	70	52	10	-136
1981 JAN 6.0	3334	3450	3498	3552	3580	7	33	58	81	104	126	147	168	187	206	224	242	260	280	305	346
JD 2444600.5	-133	-105	-107	-26	-14	-2	8	18	27	36	43	50	56	59	61	61	56	44	17	-64	-465
1980 DEC 27.0	3376	3446	3432	3518	3545	3571	3596	20	43	65	86	107	126	145	163	181	199	218	240	275	172
JD 2444590.5	-129	-122	-54	-41	-29	-18	-8	1	10	19	26	32	37	41	42	40	33	15	-32	-238	374
1980 DEC 17.0	3385	3396	3456	3483	3510	3535	3559	3582	4	26	46	66	84	103	120	138	156	177	205	258	3551
JD 2444580.5	-139	-80	-68	-56	-45	-34	-24	-14	-6	1	8	14	19	22	22	18	7	-21	-120	346	233
1980 DEC 7.0	3352	3393	3421	3448	3473	3498	3521	3544	3565	3586	6	25	43	61	78	96	115	139	181	3187	40
JD 2444570.5	-162	-94	-83	-71	-60	-50	-40	-31	-23	-15	-8	-3	1	3	2	-4	-21	-74	-371	262	159
1980 NOV 27.0	3280	3358	3385	3412	3437	3460	3483	3505	3526	3546	3565	3584	1	19	36	54	75	106	162	3538	30
JD 2444560.5	-119	-108	-97	-86	-76	-66	-56	-47	-39	-32	-26	-20	-17	-16	-19	-29	-58	-178	337	156	111
1980 NOV 17.0	3294	3322	3349	3375	3399	3423	3445	3466	3487	3506	3525	3542	3560	3577	3594	13	38	87	3330	3563	3599
(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

M19
E13

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
JD 2444680.5 1981 MAR 17.0	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386
JD 2444670.5 1981 MAR 7.0	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372
JD 2444660.5 1981 FEB 25.0	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358
JD 2444650.5 1981 FEB 15.0	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344
JD 2444640.5 1981 FEB 5.0	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328
JD 2444630.5 1981 JAN 26.0	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312
JD 2444620.5 1981 JAN 16.0	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295
JD 2444610.5 1981 JAN 6.0	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277
JD 2444600.5 1980 DEC 27.0	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258
JD 2444590.5 1980 DEC 17.0	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238
JD 2444580.5 1980 DEC 7.0	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217
JD 2444570.5 1980 NOV 27.0	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194
JD 2444560.5 1980 NOV 17.0	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169

(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)

JD2444800.5 1981 JUL 15.0 JD2444840.5 1981 AUG 24.0 JD2444880.5 1981 OCT 3.0 JD2444920.5 1981 NOV 12.0 JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E13

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

	(FLT T) (120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
JD 2444680.5	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
1981 MAR 17.0	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
JD 2444670.5	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42
1981 MAR 7.0	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
JD 2444660.5	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
1981 FEB 25.0	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
JD 2444650.5	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73
1981 FEB 15.0	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
JD 2444640.5	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88
1981 FEB 5.0	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124
JD 2444630.5	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
1981 JAN 26.0	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146
JD 2444620.5	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119
1981 JAN 16.0	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169
JD 2444610.5	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135
1981 JAN 6.0	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192
JD 2444600.5	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151
1980 DEC 27.0	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216
JD 2444590.5	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166
1980 DEC 17.0	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240
JD 2444580.5	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182
1980 DEC 7.0	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264
JD 2444570.5	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197
1980 NOV 27.0	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289
JD 2444560.5	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
1980 NOV 17.0	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314

(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)
	JD2444800.5		JD2444840.5			JD2444880.5			JD2444920.5							JD2444960.5					
	1981 JUL 15.0		1981 AUG 24.0			1981 OCT 3.0			1981 NOV 12.0							1981 DEC 22.0					

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E13

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
JD 2444680.5	2899	2995	3090	3186	3282	3379	3475	3570	73	171	270	370	470	571	672	774	875	977	1079	1181	1283
1981 MAR 17.0	-1514	-1572	-1631	-1691	-1751	1795	1764	1783	1773	1736	1699	1661	1623	1585	1548	1511	1475	1440	1405	1372	1340
JD 2444670.5	2962	3057	3153	3248	3345	3441	3537	39	135	234	333	432	533	634	735	836	938	1040	1142	1243	1345
1981 MAR 7.0	-1556	-1615	-1675	-1736	-1793	1764	1766	1785	1749	1712	1674	1636	1598	1560	1523	1486	1450	1415	1380	1347	1316
JD 2444660.5	3025	3120	3216	3311	3407	3503	16	101	198	297	396	495	596	697	798	899	1001	1103	1205	1306	1408
1981 FEB 25.0	-1599	-1659	-1720	-1780	1770	1754	1794	1762	1725	1687	1648	1610	1572	1534	1497	1461	1425	1390	1356	1324	1292
JD 2444650.5	3088	3183	3279	3374	3470	3564	67	163	261	360	459	559	659	760	861	962	1064	1166	1268	1370	1471
1981 FEB 15.0	-1644	-1705	-1766	1778	1748	1774	1774	1737	1699	1661	1623	1585	1547	1509	1472	1436	1400	1366	1332	1300	1270
JD 2444640.5	3151	3247	3342	3438	3532	36	130	227	325	423	522	622	722	823	924	1026	1128	1229	1331	1433	1534
1981 FEB 5.0	-1690	-1751	1790	1748	1755	1786	1750	1712	1674	1636	1597	1559	1521	1484	1447	1412	1377	1342	1310	1278	1248
JD 2444630.5	3215	3310	3405	3500	3582	97	193	290	388	487	586	686	786	887	988	1089	1191	1293	1395	1496	1598
1981 JAN 26.0	-1737	-1797	1753	1741	1784	1763	1725	1687	1649	1610	1572	1534	1497	1460	1423	1388	1353	1320	1288	1257	1228
JD 2444620.5	3278	3373	3468	3561	64	159	256	353	451	550	649	749	849	950	1051	1153	1254	1356	1458	1560	1661
1981 JAN 16.0	-1783	1762	1735	1767	1775	1738	1700	1662	1623	1585	1547	1510	1472	1436	1400	1365	1331	1299	1267	1237	1209
JD 2444610.5	3341	3436	3530	34	126	222	319	416	515	613	712	812	912	1013	1114	1216	1318	1419	1521	1622	1723
1981 JAN 6.0	1773	1734	1746	1787	1751	1713	1675	1637	1599	1561	1523	1485	1449	1413	1378	1343	1310	1278	1248	1219	1192
JD 2444600.5	3404	3498	3581	93	188	285	382	479	577	676	775	875	975	1076	1177	1279	1380	1482	1584	1685	1778
1980 DEC 27.0	1739	1731	1782	1764	1726	1688	1650	1612	1574	1536	1499	1462	1426	1391	1356	1323	1290	1259	1230	1203	1178
JD 2444590.5	3466	3558	61	155	251	347	444	541	640	738	837	937	1038	1138	1239	1341	1443	1544	1646	1746	1853
1980 DEC 17.0	1724	1762	1777	1740	1702	1664	1626	1588	1550	1513	1476	1440	1404	1369	1336	1303	1272	1242	1214	1188	1163
JD 2444580.5	3526	30	121	216	312	409	506	603	701	800	899	999	1099	1200	1301	1403	1504	1606	1707	1820	1913
1980 DEC 7.0	1740	1789	1753	1716	1678	1640	1602	1564	1527	1490	1454	1418	1383	1349	1317	1285	1255	1226	1200	1173	1151
JD 2444570.5	3580	87	181	277	373	470	567	664	762	861	960	1060	1160	1261	1362	1464	1565	1667	1765	1873	1974
1980 NOV 27.0	1781	1767	1729	1692	1654	1616	1579	1542	1505	1468	1433	1398	1364	1331	1299	1268	1239	1212	1187	1163	1142
JD 2444560.5	52	146	241	337	433	530	627	724	823	921	1021	1120	1221	1321	1423	1524	1625	1726	1834	1933	2034
1980 NOV 17.0	1780	1743	1706	1669	1631	1594	1556	1520	1483	1447	1412	1378	1345	1313	1282	1253	1225	1200	~~1175~~	~~1154~~	~~1135~~

(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E13

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

	(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
JD 2444680.5		144	155	174	204	257	359	627	2724	1067	460	297	225	185	161	147	138	135	136	142	153	172
1981 MAR 17.0		810	781	766	766	785	832	914	993	936	978	950	913	869	822	772	721	671	622	575	531	490
JD 2444670.5		165	182	210	257	344	541	1361	2220	634	374	270	216	185	166	154	149	148	153	162.	179	208
1981 MAR 7.0		772	754	749	762	801	874	970	999	986	962	929	888	843	795	745	695	646	599	554	512	473
JD 2444660.5		189	214	256	330	483	953	8395	916	471	322	250	209	185	170	162	159	162	170	185	210	252
1981 FEB 25.0		743	735	743	773	935	934	1000	992	973	943	906	863	816	768	718	669	622	576	533	493	456
JD 2444650.5		216	254	317	440	753	2774	1459	601	383	287	235	204	185	174	169	170	176	189	211	247	311
1981 FEB 15.0		722	726	749	801	892	988	997	981	955	921	881	836	789	740	692	644	598	555	514	475	441
JD 2444640.5		250	305	405	631	1513	2935	787	457	328	262	223	199	185	178	176	180	191	210	241	295	394
1981 FEB 5.0		711	728	771	851	960	999	988	966	935	898	855	809	762	714	666	620	576	534	495	459	426
JD 2444630.5		291	374	545	1053	8436	1087	550	374	289	241	212	195	185	181	183	192	207	234	279	359	525
1981 JAN 26.0		710	745	814	922	997	993	975	948	913	873	828	782	735	687	641	596	554	514	477	443	412
JD 2444620.5		346	478	811	2805	1668	673	427	319	260	225	203	191	185	185	191	204	226	263	328	453	768
1981 JAN 16.0		722	780	880	985	997	983	959	927	889	847	801	755	708	661	616	573	533	495	460	428	399
JD 2444610.5		424	657	1540	3295	850	490	350	278	237	211	195	187	185	189	199	217	248	300	396	608	1391
1981 JAN 6.0		751	839	955	999	989	969	940	904	864	820	774	728	682	636	593	551	513	477	444	413	387
JD 2444600.5		547	1044	7618	1140	569	385	297	247	217	198	188	184	185	192	207	232	274	348	498	922	5658
1980 DEC 27.0		801	916	996	994	977	952	919	880	838	793	747	701	656	612	570	531	494	460	428	400	378
JD 2444590.5		776	2546	1730	675	425	316	257	222	200	187	181	180	185	197	217	250	308	417	677	1930	1972
1980 DEC 17.0		873	983	998	985	962	932	896	855	812	766	721	676	631	589	549	511	476	444	415	389	363
JD 2444580.5		1372	3600	834	473	336	266	225	200	185	177	174	177	185	201	228	272	353	524	1082	5931	889
1980 DEC 7.0		951	999	991	971	944	910	872	829	785	740	695	651	608	567	528	492	459	429	402	373	355
JD 2444570.5		5801	1111	535	358	275	228	199	182	171	167	167	173	185	206	240	300	418	723	2869	1315	558
1980 NOV 27.0		996	995	980	955	924	887	847	804	759	714	670	627	585	546	509	475	444	415	391	366	347
JD 2444560.5		1748	623	384	283	229	197	177	165	158	157	160	169	185	212	256	339	524	1233	2771	686	396
1980 NOV 17.0		998	987	966	937	903	864	822	778	733	689	646	604	564	526	491	459	430	403	378	358	340
	(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)

JD2444800.5 1981 JUL 15.0

JD2444840.5 1981 AUG 24.0

JD2444880.5 1981 OCT 3.0

JD2444920.5 1981 NOV 12.0

JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E13

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
JD 2444680.5	221	219	211	196	170	128	64	5	-3	-19	-46	-82	-127	-179	-236	-298	-361	-426	-491	-555	-617
1981 MAR 17.0	-2113	-1778	-1587	-1473	-1411	1394	1424	1481	1756	1783	1804	1821	1833	1840	1843	1843	1839	1833	1825	1815	1803
JD 2444670.5	232	226	213	191	154	95	23	-0	-11	-34	-67	-108	-157	-211	-270	-332	-396	-461	-525	-587	-646
1981 MAR 7.0	-1805	-1605	-1484	-1415	-1388	1407	1467	1756	1785	1808	1827	1840	1850	1854	1855	1853	1848	1840	1831	1820	1808
JD 2444660.5	240	229	210	178	125	50	0	-6	-24	-53	-91	-136	-188	-245	-305	-368	-432	-496	-558	-618	-676
1981 FEB 25.0	-1625	-1497	-1422	-1387	1395	1448	1755	1786	1812	1833	1848	1859	1865	1868	1867	1863	1856	1847	1837	1825	1812
JD 2444650.5	244	227	199	153	81	9	-2	-16	-41	-75	-117	-165	-221	-279	-341	-404	-467	-530	-591	-649	-704
1981 FEB 15.0	-1513	-1431	-1388	1386	1430	1502	1788	1815	1838	1855	1867	1876	1880	1880	1877	1871	1863	1853	1842	1830	1816
JD 2444640.5	244	219	179	113	30	-0	-10	-31	-61	-100	-146	-198	-255	-315	-377	-440	-503	-564	-623	-680	-732
1981 FEB 5.0	-1442	-1393	1382	1414	1487	1789	1818	1843	1862	1876	1886	1891	1893	1891	1887	1879	1870	1859	1847	1834	1821
JD 2444630.5	238	202	144	60	3	-5	-22	-49	-85	-128	-178	-232	-291	-352	-414	-476	-538	-598	-655	-709	-760
1981 JAN 26.0	-1401	-1381	1402	1468	1539	1821	1847	1868	1884	1896	1903	1906	1905	1902	1895	1887	1877	1865	1852	1838	1825
JD 2444620.5	223	172	93	12	-2	-15	-38	-71	-111	-158	-210	-267	-327	-389	-451	-513	-573	-631	-686	-738	-786
1981 JAN 16.0	-1384	1394	1450	1533	1824	1852	1874	1892	1905	1914	1918	1919	1917	1911	1904	1894	1883	1870	1857	1843	1829
JD 2444610.5	198	126	35	-0	-9	-29	-58	-95	-140	-190	-245	-303	-364	-426	-488	-548	-607	-664	-717	-766	-810
1981 JAN 6.0	1392	1434	1518	1826	1856	1881	1900	1915	1925	1931	1933	1932	1927	1920	1911	1900	1888	1875	1861	1847	1834
JD 2444600.5	157	66	3	-4	-21	-46	-81	-122	-170	-223	-280	-340	-401	-463	-524	-584	-641	-695	-746	-792	-831
1980 DEC 27.0	1423	1499	1577	1860	1886	1908	1924	1936	1943	1947	1946	1943	1937	1929	1919	1907	1894	1880	1866	1852	1842
JD 2444590.5	101	14	-1	-14	-36	-67	-106	-152	-203	-258	-317	-377	-439	-500	-560	-618	-673	-725	-774	-817	-859
1980 DEC 17.0	1481	1571	1864	1892	1915	1933	1946	1955	1960	1961	1959	1954	1946	1937	1925	1913	1899	1885	1871	1858	1842
JD 2444580.5	39	-0	-8	-27	-55	-91	-134	-183	-237	-294	-354	-415	-476	-536	-595	-652	-705	-755	-800	-847	-880
1980 DEC 7.0	1557	1867	1897	1922	1942	1957	1967	1974	1976	1975	1971	1964	1955	1944	1932	1919	1905	1891	1877	1858	1848
JD 2444570.5	3	-4	-19	-43	-77	-117	-164	-216	-272	-330	-391	-452	-513	-572	-630	-684	-735	-782	-824	-865	-899
1980 NOV 27.0	1621	1902	1929	1950	1967	1979	1987	1991	1991	1988	1982	1974	1964	1952	1939	1925	1911	1897	1884	1867	1855
JD 2444560.5	-1	-12	-33	-63	-101	-145	-195	-250	-307	-367	-428	-489	-549	-607	-663	-715	-764	-808	-851	-886	-917
1980 NOV 17.0	1907	1935	1959	1977	1991	2000	2005	2007	2005	2000	1992	1983	1972	1959	1945	1931	1917	1903	1886	1875	1863

(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

M19
E13

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
JD 2444680.5	465	487	514	550	604	708	1007	3609	86	88	91	94	97	101	105	109	114	119	124	130	136
1981 MAR 17.0	202	215	227	238	250	261	271	279	130	135	140	145	151	157	163	170	176	183	191	198	206
JD 2444670.5	469	493	524	568	645	828	1703	86	88	91	94	97	100	104	108	113	118	123	128	134	140
1981 MAR 7.0	213	225	237	248	259	270	279	130	134	140	145	151	156	162	169	175	182	189	197	204	212
JD 2444660.5	475	502	539	599	722	1147	86	88	90	93	96	100	103	107	112	116	121	126	132	138	144
1981 FEB 25.0	223	235	246	258	268	278	130	134	139	145	150	156	162	168	174	181	188	195	203	210	218
JD 2444650.5	483	516	563	652	898	2690	88	90	93	96	99	102	106	110	115	120	125	130	136	142	148
1981 FEB 15.0	233	245	256	267	277	285	134	139	144	150	155	161	167	173	180	187	194	201	209	217	225
JD 2444640.5	495	535	603	761	1477	87	90	92	95	98	101	105	109	113	118	123	128	134	140	146	152
1981 FEB 5.0	243	254	265	275	284	134	139	144	149	154	160	166	172	179	186	193	200	207	215	223	231
JD 2444630.5	512	566	676	1049	5033	89	92	94	97	100	104	108	112	117	121	127	132	138	144	150	156
1981 JAN 26.0	252	263	274	283	290	139	143	149	154	159	165	171	178	184	191	198	206	213	221	229	237
JD 2444620.5	536	618	843	2361	89	91	94	96	100	103	107	111	115	120	125	130	136	142	148	154	161
1981 JAN 16.0	262	272	282	290	138	143	148	153	159	164	170	177	183	190	197	204	212	219	227	235	244
JD 2444610.5	576	725	1375	89	91	93	96	99	102	106	109	114	118	123	128	134	139	145	152	158	165
1981 JAN 6.0	270	281	289	138	143	148	153	158	164	169	176	182	189	195	203	210	218	225	233	242	250
JD 2444600.5	649	998	4718	90	93	95	98	101	104	108	112	117	121	126	132	137	143	149	156	162	169
1980 DEC 27.0	279	288	295	142	147	152	157	163	168	174	181	187	194	201	208	216	223	231	239	248	256
JD 2444590.5	810	2178	90	92	94	97	100	103	107	111	115	119	124	129	135	141	147	153	160	166	174
1980 DEC 17.0	287	294	142	147	152	157	162	168	173	179	186	193	199	207	214	222	229	237	246	254	263
JD 2444580.5	1299	90	92	94	96	99	102	105	109	113	118	122	127	133	138	144	150	157	163	171	178
1980 DEC 7.0	293	142	146	151	156	161	167	172	178	185	191	198	205	212	220	227	235	243	252	261	269
JD 2444570.5	4573	91	93	95	98	101	104	108	112	116	120	125	130	136	142	148	154	161	167	175	182
1980 NOV 27.0	299	146	150	155	160	166	171	177	183	190	196	203	210	218	225	233	241	249	258	266	275
JD 2444560.5	91	92	95	97	100	103	106	110	114	119	123	128	134	139	145	151	158	164	172	179	186
1980 NOV 17.0	146	150	155	160	165	170	176	182	188	195	201	208	216	223	231	239	247	255	264	273	281

(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE — EARTH - MARS TRAJECTORY PARAMETERS — M19 E13

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
JD 2444680.5 1981 MAR 17.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444670.5 1981 MAR 7.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444660.5 1981 FEB 25.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444650.5 1981 FEB 15.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444640.5 1981 FEB 5.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444630.5 1981 JAN 26.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444620.5 1981 JAN 16.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444610.5 1981 JAN 6.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444600.5 1980 DEC 27.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444590.5 1980 DEC 17.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444580.5 1980 DEC 7.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1479
JD 2444570.5 1980 NOV 27.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1394
JD 2444560.5 1980 NOV 17.0	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1435	1344

(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)

JD2444800.5 1981 JUL 15.0	JD2444840.5 1981 AUG 24.0	JD2444880.5 1981 OCT 3.0	JD2444920.5 1981 NOV 12.0	JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

M19
E13

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
JD 2444680.5	1451	1262	1134	1070	1089	1237	1606	2276	2471	2259	2052	1850	1653	1463	1280	1105	939	782	634	498	372
1981 MAR 17.0	2027	1741	1511	1344	1268	1340	1657	2274	2588	2409	2235	2068	1908	1755	1609	1472	1343	1222	1111	1009	916
JD 2444670.5	1232	1096	1020	1015	1118	1405	1988	2550	2340	2133	1932	1735	1544	1360	1184	1015	856	705	565	434	315
1981 MAR 7.0	1732	1501	1328	1233	1263	1502	2043	2693	2514	2341	2173	2012	1857	1710	1570	1438	1314	1199	1092	995	907
JD 2444660.5	1064	977	954	1022	1241	1724	2627	2418	2212	2011	1814	1623	1438	1260	1090	928	774	631	497	373	261
1981 FEB 25.0	1490	1312	1204	1202	1376	1827	2791	2614	2441	2274	2112	1957	1808	1665	1531	1404	1286	1175	1074	982	899
JD 2444650.5	943	904	944	1108	1497	2207	2494	2289	2068	1892	1700	1514	1335	1163	998	843	696	558	431	314	209
1981 FEB 15.0	1298	1179	1157	1274	1639	2305	2708	2536	2370	2208	2052	1902	1758	1621	1492	1371	1257	1152	1056	968	891
JD 2444640.5	864	881	1002	1308	1921	2569	2365	2164	1967	1775	1589	1408	1234	1068	910	760	619	488	367	258	162
1981 FEB 5.0	1158	1112	1193	1480	2065	2796	2626	2460	2299	2143	1992	1847	1709	1578	1454	1337	1229	1129	1038	956	886
JD 2444630.5	831	918	1156	1663	2477	2440	2239	2042	1850	1662	1480	1305	1137	976	823	679	545	420	306	205	122
1981 JAN 26.0	1078	1126	1350	1843	2598	2710	2545	2385	2229	2078	1932	1793	1660	1534	1415	1304	1201	1107	1021	945	886
JD 2444620.5	851	1034	1443	2179	2516	2314	2117	1924	1735	1552	1375	1205	1042	886	740	602	473	355	248	157	102
1981 JAN 16.0	1071	1242	1648	2344	2788	2625	2465	2310	2159	2013	1873	1739	1611	1491	1378	1272	1174	1085	1004	937	900
JD 2444610.5	938	1263	1895	2592	2390	2192	1998	1808	1624	1445	1273	1107	950	800	659	527	405	293	195	120	179
1981 JAN 6.0	1154	1483	2094	2861	2699	2541	2386	2236	2090	1949	1814	1685	1563	1448	1340	1240	1147	1063	990	935	987
JD 2444600.5	1119	1641	2464	2467	2268	2073	1882	1696	1516	1341	1174	1013	861	716	581	455	339	235	148	115	1794
1980 DEC 27.0	1346	1864	2623	2768	2611	2458	2308	2162	2021	1886	1756	1633	1516	1406	1303	1208	1121	1043	978	955	2274
JD 2444590.5	1427	2165	2546	2346	2150	1957	1770	1587	1411	1241	1078	922	775	636	506	386	277	181	114	318	270
1980 DEC 17.0	1662	2357	2833	2677	2524	2375	2230	2089	1953	1823	1699	1580	1469	1364	1267	1177	1095	1024	974	1126	1113
JD 2444580.5	1881	2627	2426	2228	2034	1845	1660	1482	1309	1143	985	834	692	559	434	320	218	135	131	1911	0
1980 DEC 7.0	2098	2892	2736	2587	2438	2294	2153	2017	1887	1761	1642	1529	1423	1323	1231	1147	1071	1008	1002	2391	891
JD 2444570.5	2434	2509	2310	2114	1922	1736	1555	1379	1211	1050	896	750	613	485	366	258	164	105	636	71	0
1980 NOV 27.0	2593	2795	2645	2498	2354	2214	2078	1946	1821	1700	1586	1479	1377	1283	1196	1117	1048	1002	1380	1000	847
JD 2444560.5	2595	2394	2196	2003	1814	1630	1452	1281	1116	959	810	669	537	414	301	200	119	149	569	0	0
1980 NOV 17.0	2848	2699	2553	2410	2270	2135	2003	1877	1756	1641	1532	1429	1333	1244	1163	1089	1029	1041	1387	896	828
(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M19 E13

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

	(FLT T)	(120)	(130)	(140)	(150)	(160)	(170)	(180)	(190)	(200)	(210)	(220)	(230)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)
JD 2444680.5		3477	3004	2645	2415	2357	2577	3263	4550	5059	4668	4287	3918	3561	3217	2889	2577	2281	2004	1746	1507	1288
1981 MAR 17.0		2899	2995	3090	3186	3282	3379	3475	3570	73	171	270	370	470	571	672	774	875	977	1079	1181	1283
JD 2444670.5		2964	2597	2347	2248	2381	2907	4031	5243	4854	4474	4105	3747	3402	3070	2754	2453	2170	1904	1657	1430	1222
1981 MAR 7.0		2962	3057	3153	3248	3345	3441	3537	39	135	234	333	432	533	634	735	836	938	1040	1142	1243	1345
JD 2444660.5		2554	2490	2158	2223	2617	3551	5418	5032	4653	4285	3927	3580	3246	2926	2621	2332	2060	1806	1571	1355	1159
1981 FEB 25.0		3025	3120	3216	3311	3407	3503	16	101	198	297	396	495	596	697	798	899	1001	1103	1205	1306	1408
JD 2444650.5		2240	2083	2096	2383	3135	4512	5202	4826	4458	4100	3752	3416	3093	2784	2491	2213	1953	1710	1486	1282	1100
1981 FEB 15.0		3088	3183	3279	3374	3470	3564	67	163	261	360	459	559	659	760	861	962	1064	1166	1268	1370	1471
JD 2444640.5		2022	1993	2195	2788	3985	5366	4991	4624	4266	3918	3581	3255	2943	2646	2363	2097	1848	1617	1405	1214	1048
1981 FEB 5.0		3151	3247	3342	3438	3532	36	130	227	325	423	522	622	722	823	924	1026	1128	1229	1331	1433	1534
JD 2444630.5		1909	2044	2505	3505	5075	5150	4785	4427	4078	3740	3413	3098	2797	2510	2239	1984	1746	1527	1327	1150	1008
1981 JAN 26.0		3215	3310	3405	3500	3582	97	193	290	388	487	586	686	786	887	988	1089	1191	1293	1395	1496	1598
JD 2444620.5		1921	2277	3092	4523	5304	4939	4582	4234	3894	3565	3248	2944	2653	2377	2117	1874	1647	1440	1253	1094	1002
1981 JAN 16.0		3278	3373	3468	3561	64	159	256	353	451	550	649	749	849	950	1051	1153	1254	1356	1458	1560	1661
JD 2444610.5		2092	2747	3989	5453	5090	4733	4384	4044	3714	3394	3087	2793	2513	2248	1999	1767	1552	1356	1184	1055	1166
1981 JAN 6.0		3341	3436	3530	34	126	222	319	416	515	613	712	812	912	1013	1114	1216	1318	1419	1521	1622	1723
JD 2444600.5		2464	3505	5087	5236	4880	4531	4190	3858	3537	3227	2930	2646	2376	2122	1884	1663	1460	1277	1125	1070	4068
1980 DEC 27.0		3404	3498	3581	93	188	285	382	479	577	676	775	875	975	1076	1177	1279	1380	1482	1584	1685	1778
JD 2444590.5		3088	4522	5379	5023	4674	4333	4000	3676	3364	3064	2776	2503	2244	2000	1773	1563	1372	1205	1088	1444	1382
1980 DEC 17.0		3466	3558	61	155	251	347	444	541	640	738	837	937	1038	1138	1239	1341	1443	1544	1646	1746	1853
JD 2444580.5		3980	5519	5164	4815	4473	4139	3814	3499	3196	2905	2627	2363	2115	1882	1666	1467	1289	1143	1133	4302	891
1980 DEC 7.0		3526	30	121	216	312	409	506	603	701	800	899	999	1099	1200	1301	1403	1504	1606	1707	1820	1913
JD 2444570.5		5027	5304	4955	4612	4276	3949	3632	3326	3032	2750	2482	2229	1990	1768	1562	1375	1212	1107	2016	1071	847
1980 NOV 27.0		3580	87	181	277	373	470	567	664	762	861	960	1060	1160	1261	1362	1464	1565	1667	1765	1873	1974
JD 2444560.5		5443	5093	4749	4413	4084	3765	3455	3158	2872	2600	2342	2098	1870	1658	1463	1289	1147	1190	1955	896	828
1980 NOV 17.0		52	146	241	337	433	530	627	724	823	921	1021	1120	1221	1321	1423	1524	1625	1726	1834	1933	2034
	(FLT T)	(240)	(250)	(260)	(270)	(280)	(290)	(300)	(310)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)

JD2444800.5 1981 JUL 15.0 | JD2444840.5 1981 AUG 24.0 | JD2444880.5 1981 OCT 3.0 | JD2444920.5 1981 NOV 12.0 | JD2444960.5 1981 DEC 22.0

EARTH DEPARTURE OR ARRIVAL DATE

M19
E14

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444880.500

EARTH ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.0000000	A.U.
SIDEREAL PERIOD	=	365.256	DAYS
ECCENTRICITY	=	0.01671684	
INCLINATION	=	0.	DEGREES
LONG. OF ASC. NODE	=	0.	DEGREES
ARG. OF PERIHELION	=	102.627	DEGREES
MEAN ANOM. AT EPOCH	=	268.992	DEGREES
DATE OF NODAL PASSAGE	=	2444870.613	(J.D.)
OBLIQUITY OF EQUATOR	=	23.442	DEGREES
ARG. OF V. EQUINOX	=	0.	DEGREES

S87 LIBRARY DECK NO. 10836L304

EPOCH = 2444880.500

MARS ORBIT ELEMENTS

SEMI-MAJOR AXIS	=	1.5236910	A.U.
SIDEREAL PERIOD	=	686.980	DAYS
ECCENTRICITY	=	0.09338862	
INCLINATION	=	1.850	DEGREES
LONG. OF ASC. NODE	=	49.417	DEGREES
ARG. OF PERIHELION	=	286.306	DEGREES
MEAN ANOM. AT EPOCH	=	127.050	DEGREES
DATE OF NODAL PASSAGE	=	2444759.486	(J.D.)
OBLIQUITY OF EQUATOR	=	24.023	DEGREES
ARG. OF V. EQUINOX	=	219.068	DEGREES

M19
E14

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = HYPERBOLIC EXCESS SPEED AT EARTH DEPARTURE/ARVL (.001 EMOS)
LOWER PARAMETER = HYPERBOLIC EXCESS SPEED AT MARS ARVL/DEPARTURE (.001 EMOS)

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD 2444680.5	516	468	423	383	358	813	310	242	206	178	154	137	128	129	140	162	193	235	290	363	464
1981 MAR 17.0	387	356	330	308	300	668	265	229	213	203	195	190	188	189	194	203	217	238	269	314	383
JD 2444670.5	493	447	405	372	431	420	269	225	194	167	147	133	128	134	151	178	215	264	329	417	544
1981 MAR 7.0	383	355	331	315	372	348	253	232	219	210	203	199	199	202	208	220	238	264	303	361	450
JD 2444660.5	470	425	389	386	1004	304	246	210	181	158	140	131	131	143	165	198	242	299	378	488	653
1981 FEB 25.0	380	354	334	341	801	283	252	237	225	217	212	210	211	215	224	239	262	295	345	420	541
JD 2444650.5	447	408	385	683	366	269	227	196	170	149	136	131	137	155	183	222	274	344	441	582	803
1981 FEB 15.0	377	355	345	575	332	275	255	242	232	225	221	221	224	231	243	262	290	333	398	499	666
JD 2444640.5	426	395	443	542	297	246	211	182	159	142	133	135	147	171	206	253	315	401	524	712	1009
1981 FEB 5.0	376	358	399	463	301	274	259	247	239	234	232	233	238	248	264	289	325	380	466	606	836
JD 2444630.5	408	403	1479	337	265	226	195	169	149	137	134	142	161	192	234	291	367	475	636	890	1272
1981 JAN 26.0	375	376	1187	334	295	276	263	254	247	243	243	246	254	268	289	320	368	441	559	753	1052
JD 2444620.5	400	589	417	287	242	208	180	158	142	135	139	154	180	218	270	338	434	573	790	1128	0
1981 JAN 16.0	381	515	395	317	294	280	268	260	256	254	256	262	273	291	318	359	422	521	684	946	0
JD 2444610.5	434	704	316	259	222	192	167	148	137	137	148	171	205	251	314	399	521	706	999	1406	1462
1981 JAN 6.0	412	603	343	313	296	283	274	268	265	265	270	279	294	318	353	407	492	628	852	1171	1234
JD 2444600.5	1050	362	277	236	203	176	155	141	137	144	163	193	235	292	369	476	636	886	1259	1480	1428
1980 DEC 27.0	858	379	332	312	298	288	280	276	275	278	285	298	319	350	396	468	583	772	1060	1250	1211
JD 2444590.5	473	299	250	215	186	163	146	138	141	156	183	221	273	342	438	577	791	1120	0	1447	1394
1980 DEC 17.0	457	353	328	313	301	293	287	285	287	292	303	321	348	388	450	547	705	956	0	1226	1187
JD 2444580.5	329	266	228	197	171	152	140	140	151	174	209	256	320	405	527	711	994	1386	1467	1414	1360
1980 DEC 7.0	377	345	327	314	305	298	295	295	299	308	323	347	382	436	518	650	863	1164	1240	1202	1162
JD 2444570.5	284	241	208	180	158	144	139	147	166	198	241	299	377	485	643	885	1241	0	1434	1380	1326
1980 NOV 27.0	361	341	327	316	309	305	304	306	31[illegible]	327	347	378	424	495	605	784	1053	0	1215	1176	1137
JD 2444560.5	255	219	190	166	149	141	144	160	188	228	281	351	448	585	792	1104	1495	1455	1401	1347	1292
1980 NOV 17.0	355	339	328	319	314	312	313	319	330	348	374	415	475	569	718	950	1245	1227	1189	1150	1111

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E14

UPPER PARAMETER = DECLINATION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF EARTH DEPARTURE/ARVL ASYMPTOTE (.1 DEG)

	(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD 2444680.5		-130	-99	-59	-0	120	682	-331	-198	-149	-130	-130	-144	-169	-193	-209	-214	-209	-200	-188	-175	-163
1981 MAR 17.0		3169	3231	3287	3333	3355	3419	96	42	45	46	33	3595	3532	3451	3374	3319	3291	3284	3293	3311	3330
JD 2444670.5		-126	-91	-40	50	342	-470	-264	-192	-162	-154	-161	-182	-208	-228	-237	-236	-228	-217	-204	-192	-182
1981 MAR 7.0		3149	3209	3261	3297	3284	204	6	0	6	3	3579	3529	3455	3372	3301	3257	3239	3240	3253	3270	3286
JD 2444660.5		-119	-76	-4	172	-426	-347	-241	-198	-181	-181	-197	-221	-245	-259	-261	-254	-244	-232	-220	-209	-202
1981 FEB 25.0		3127	3184	3230	3246	625	3584	3553	3560	3563	3551	3515	3451	3368	3287	3227	3195	3186	3193	3209	3225	3233
JD 2444650.5		-108	-50	70	533	-455	-298	-237	-211	-204	-213	-235	-260	-278	-283	-279	-269	-258	-245	-234	-226	-222
1981 FEB 15.0		3104	3157	3191	3246	10	3506	3507	3516	3513	3489	3437	3360	3273	3199	3153	3133	3133	3145	3161	3173	3167
JD 2444640.5		-89	-0	261	-562	-366	-281	-243	-229	-232	-249	-273	-294	-304	-301	-292	-281	-269	-257	-248	-242	-243
1981 FEB 5.0		3079	3125	3146	224	3464	3451	3461	3466	3452	3413	3345	3257	3172	3111	3080	3072	3079	3094	3108	3109	3080
JD 2444630.5		-54	108	-291	-452	-329	-278	-256	-253	-264	-286	-308	-321	-321	-312	-301	-289	-278	-268	-261	-259	-262
1981 JAN 26.0		3051	3088	558	3443	3392	3401	3411	3406	3379	3321	3236	3145	3071	3026	3009	3011	3024	3039	3045	3028	2968
JD 2444620.5		12	399	-562	-385	-316	-285	-275	-280	-298	-320	-336	-338	-330	-318	-306	-294	-285	-277	-273	-272	0
1981 JAN 16.0		3021	3092	3502	3333	3336	3349	3352	3334	3287	3210	3115	3030	2973	2946	2941	2951	2966	2977	2969	2925	0
JD 2444610.5		168	-605	-453	-356	-315	-298	-297	-310	-331	-347	-351	-344	-331	-319	-307	-297	-289	-284	-281	-278	-13
1981 JAN 6.0		2994	275	3280	3265	3280	3289	3280	3245	3176	3082	2988	2919	2881	2870	2876	2890	2904	2904	2874	2800	1848
JD 2444600.5		533	-544	-400	-345	-321	-315	-323	-340	-356	-361	-354	-341	-327	-316	-306	-298	-292	-288	-283	21	-6
1980 DEC 27.0		3274	3256	3191	3205	3220	3219	3193	3134	3045	2946	2865	2817	2798	2799	2812	2827	2834	2817	2758	1766	1833
JD 2444590.5		-663	-452	-376	-343	-331	-334	-347	-362	-368	-361	-347	-332	-320	-310	-302	-296	-291	-286	0	28	-0
1980 DEC 17.0		3389	3116	3125	3144	3150	3133	3085	3002	2901	2811	2752	2725	2722	2733	2749	2760	2754	2712	0	1752	1818
JD 2444580.5		-519	-407	-364	-347	-344	-353	-365	-371	-364	-348	-332	-319	-309	-302	-296	-291	-285	-274	62	34	5
1980 DEC 7.0		3045	3039	3061	3074	3067	3028	2954	2855	2758	2689	2653	2645	2653	2668	2683	2686	2660	2592	1670	1737	1804
JD 2444570.5		-442	-384	-360	-353	-357	-366	-370	-363	-346	-328	-314	-304	-297	-292	-287	-282	-271	0	68	40	12
1980 NOV 27.0		2949	2974	2993	2993	2965	2901	2806	2705	2628	2589	2569	2573	2588	2605	2614	2601	2550	0	1656	1722	1789
JD 2444560.5		-402	-370	-358	-358	-363	-366	-359	-340	-320	-304	-294	-287	-283	-279	-275	-266	-248	101	74	46	18
1980 NOV 17.0		2881	2907	2915	2897	2844	2756	2655	2569	2517	2495	2496	2509	2527	2541	2538	2505	2437	1573	1641	1708	1774
	(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E14

UPPER PARAMETER = DECLINATION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)
LOWER PARAMETER = RT ASCENSION OF MARS ARVL/DEPARTURE ASYMPTOTE (.1 DEG)

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD 2444680.5	174	162	143	107	19	-349	452	321	272	244	225	210	197	187	179	172	168	166	165	167	169
1981 MAR 17.0	625	641	655	670	683	558	606	661	675	683	688	692	696	699	703	707	711	715	718	717	708
JD 2444670.5	159	143	116	55	-162	568	354	288	255	233	217	203	192	182	175	168	164	161	160	160	160
1981 MAR 7.0	580	596	611	628	635	408	586	613	625	632	637	642	646	649	653	657	660	662	662	656	640
JD 2444660.5	141	119	75	-51	543	398	304	264	239	222	207	195	185	176	168	162	157	154	152	150	147
1981 FEB 25.0	534	551	569	590	3500	496	545	563	573	580	586	590	594	598	601	605	607	607	602	590	562
JD 2444650.5	118	86	5	-329	461	321	270	242	223	209	196	185	175	166	159	153	148	143	140	135	126
1981 FEB 15.0	490	508	531	495	368	472	498	512	521	528	533	538	542	545	549	551	551	548	539	517	472
JD 2444640.5	89	35	-151	540	341	274	242	222	207	194	183	173	163	155	147	141	135	130	123	114	96
1981 FEB 5.0	446	469	497	108	390	431	449	461	469	475	481	485	489	492	494	495	493	486	469	434	365
JD 2444630.5	50	-57	337	373	278	240	218	202	189	178	168	158	149	141	134	126	119	112	102	84	53
1981 JAN 26.0	406	437	3340	292	361	386	400	409	417	423	428	432	435	438	439	438	432	419	392	337	237
JD 2444620.5	-11	-294	425	284	236	211	194	182	171	161	151	142	133	125	117	109	100	89	73	44	0
1981 JAN 16.0	371	394	150	287	321	338	350	358	365	370	375	378	381	383	382	378	368	347	303	221	0
JD 2444610.5	-136	471	295	231	202	184	171	161	151	142	133	124	116	107	98	89	77	61	34	-7	33
1981 JAN 6.0	346	3453	206	255	277	290	300	307	313	318	322	325	327	327	324	316	299	265	199	86	61
JD 2444600.5	-465	321	226	191	172	159	148	139	130	122	113	105	96	87	77	65	49	25	-13	6	14
1980 DEC 27.0	172	108	188	215	231	242	250	256	261	266	269	271	271	269	263	250	223	170	74	3600	18
JD 2444590.5	374	225	179	158	144	134	125	117	109	101	92	84	74	64	52	37	14	-20	0	-12	-4
1980 DEC 17.0	3551	118	154	172	184	193	200	205	210	213	215	216	215	210	199	178	136	57	0	3557	3576
JD 2444580.5	233	168	143	128	118	110	102	95	87	79	70	61	51	39	24	3	-27	-72	-39	-31	-22
1980 DEC 7.0	40	93	114	128	137	144	150	155	158	161	162	161	157	148	131	98	34	3527	3497	3515	3534
JD 2444570.5	159	127	111	101	93	86	79	72	64	56	47	37	25	11	-7	-35	-76	0	-57	-49	-40
1980 NOV 27.0	30	57	72	82	90	96	101	104	107	108	107	104	97	83	56	5	3515	0	3455	3473	3492
JD 2444560.5	111	93	82	74	68	62	55	48	41	32	23	12	-1	-18	-43	-80	-127	-83	-75	-66	-58
1980 NOV 17.0	3599	17	28	36	43	47	51	54	55	55	52	46	34	13	3572	3497	3382	3394	3413	3432	3450
(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M19 E14

UPPER PARAMETER = COMMUNICATION DISTANCE AT MARS ARVL/DEPARTURE (.001 AU)

	(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD 2444680.5 1981 MAR 17.0		2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386	2386
JD 2444670.5 1981 MAR 7.0		2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372
JD 2444660.5 1981 FEB 25.0		2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358	2358
JD 2444650.5 1981 FEB 15.0		2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344	2344
JD 2444640.5 1981 FEB 5.0		2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328	2328
JD 2444630.5 1981 JAN 26.0		2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312
JD 2444620.5 1981 JAN 16.0		2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	0
JD 2444610.5 1981 JAN 6.0		2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277	2277
JD 2444600.5 1980 DEC 27.0		2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258	2258
JD 2444590.5 1980 DEC 17.0		2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	2238	0	2238	2238
JD 2444580.5 1980 DEC 7.0		2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217	2217
JD 2444570.5 1980 NOV 27.0		2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	2194	0	2194	2194	2194
JD 2444560.5 1980 NOV 17.0		2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169	2169

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

M19
E14

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = SUN-MARS-EARTH ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)
LOWER PARAMETER = SUN-EARTH-MARS ANGLE AT MARS ARVL/DEPARTURE (.1 DEG)

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD 2444680.5	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
1981 MAR 17.0	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
JD 2444670.5	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42
1981 MAR 7.0	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
JD 2444660.5	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
1981 FEB 25.0	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
JD 2444650.5	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73
1981 FEB 15.0	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
JD 2444640.5	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88
1981 FEB 5.0	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124
JD 2444630.5	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
1981 JAN 26.0	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146
JD 2444620.5	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	0
1981 JAN 16.0	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	169	0
JD 2444610.5	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135	135
1981 JAN 6.0	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192
JD 2444600.5	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151	151
1980 DEC 27.0	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216	216
JD 2444590.5	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	0	166	166	166	166
1980 DEC 17.0	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	0	240	240	240	240
JD 2444580.5	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182	182
1980 DEC 7.0	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264
JD 2444570.5	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	0	197	197	197
1980 NOV 27.0	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	289	0	289	289	289
JD 2444560.5	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212	212
1980 NOV 17.0	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314	314

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E14

UPPER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
LOWER PARAMETER = TRUE ANOM IN TRANSFER ORBIT AT EARTH/MARS DEPARTURE (.1 DEG)

	(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD 2444680.5		1283	1384	1485	1585	1685	1780	1885	1983	2081	2178	2275	2371	2467	2563	2658	2754	2849	2944	3040	3136	3232
1981 MAR 17.0		1340	1309	1280	1253	1228	1205	1184	1166	1150	1137	1126	1118	1113	1111	1112	1115	1122	1133	1149	1174	1214
JD 2444670.5		1345	1446	1547	1648	1746	1850	1948	2046	2143	2241	2337	2434	2530	2625	2721	2816	2912	3007	3102	3198	3294
1981 MAR 7.0		1316	1286	1257	1230	1206	1183	1163	1145	1130	1118	1108	1102	1098	1097	1100	1105	1115	1130	1153	1187	1242
JD 2444660.5		1408	1509	1610	1710	1820	1912	2010	2109	2206	2304	2400	2497	2593	2688	2784	2879	2975	3070	3165	3261	3357
1981 FEB 25.0		1292	1263	1235	1209	1184	1163	1143	1127	1112	1101	1093	1088	1086	1087	1091	1100	1113	1133	1164	1211	1288
JD 2444650.5		1471	1572	1673	1769	1876	1975	2074	2172	2270	2367	2464	2560	2656	2752	2847	2943	3038	3133	3229	3324	3420
1981 FEB 15.0		1270	1241	1214	1189	1165	1144	1126	1110	1097	1087	1080	1077	1076	1080	1087	1099	1117	1144	1185	1251	1362
JD 2444640.5		1534	1635	1735	1842	1939	2038	2137	2235	2333	2430	2527	2623	2719	2815	2911	3006	3101	3196	3292	3387	3483
1981 FEB 5.0		1248	1220	1194	1169	1147	1127	1110	1096	1084	1076	1071	1069	1071	1077	1087	1103	1127	1163	1220	1313	1474
JD 2444630.5		1598	1698	1818	1903	2002	2102	2200	2299	2397	2494	2591	2687	2783	2879	2974	3069	3165	3260	3355	3450	3545
1981 JAN 26.0		1228	1201	1173	1152	1131	1112	1097	1084	1074	1068	1065	1065	1069	1078	1093	1114	1146	1194	1273	1407	1630
JD 2444620.5		1661	1759	1867	1966	2066	2165	2264	2362	2460	2557	2654	2750	2846	2942	3037	3133	3228	3323	3418	3513	0
1981 JAN 16.0		1209	1184	1158	1137	1117	1100	1086	1075	1067	1063	1062	1065	1072	1085	1103	1132	1174	1241	1352	1543	0
JD 2444610.5		1723	1832	1929	2029	2129	2228	2327	2425	2523	2620	2717	2813	2909	3005	3101	3196	3291	3386	3481	3571	76
1981 JAN 6.0		1192	1166	1144	1123	1106	1090	1078	1069	1063	1061	1063	1068	1079	1096	1120	1157	1215	1308	1468	1710	1767
JD 2444600.5		1778	1891	1991	2091	2191	2291	2390	2488	2586	2683	2780	2876	2972	3068	3163	3259	3354	3449	3542	45	138
1980 DEC 27.0		1178	1153	1131	1113	1096	1083	1073	1066	1062	1063	1067	1076	1091	1112	1145	1194	1273	1406	1624	1781	1740
JD 2444590.5		1853	1953	2053	2154	2254	2353	2452	2550	2648	2745	2842	2939	3034	3130	3226	3321	3416	3510	0	105	200
1980 DEC 17.0		1163	1141	1121	1104	1090	1079	1071	1066	1065	1068	1075	1088	1107	1135	1178	1245	1355	1541	0	1755	1713
JD 2444580.5		1913	2014	2115	2215	2315	2415	2514	2612	2710	2807	2904	3000	3096	3192	3287	3382	3477	3569	71	166	262
1980 DEC 7.0		1151	1131	1113	1098	1086	1077	1071	1069	1070	1076	1087	1104	1129	1166	1223	1315	1470	1705	1769	1728	1687
JD 2444570.5		1974	2075	2176	2276	2376	2476	2575	2673	2771	2868	2965	3061	3157	3253	3348	3443	3537	0	131	227	323
1980 NOV 27.0		1142	1123	1108	1094	1084	1078	1074	1075	1079	1088	1103	1124	1157	1205	1282	1411	1618	0	1743	1702	1661
JD 2444560.5		2034	2135	2236	2337	2437	2536	2635	2733	2831	2928	3025	3122	3218	3313	3408	3503	3584	96	191	287	383
1980 NOV 17.0		1135	1118	1104	1093	1086	1081	1080	1083	1091	1103	1122	1150	1192	1257	1363	1538	1754	1758	1718	1676	1635
	(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E14

UPPER PARAMETER = INCLINATION OF TRANSFER ORBIT (REL TO ECLIPTIC) (.01 DEG)
LOWER PARAMETER = ECCENTRICITY OF TRANSFER ORBIT (.001)

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD 2444680.5	172	203	259	369	679	4258	914	430	287	220	183	161	147	139	135	136	140	148	163	186	225
1981 MAR 17.0	490	452	417	386	359	336	313	295	280	268	259	253	250	251	256	266	282	306	341	391	465
JD 2444670.5	208	256	347	564	1601	1721	582	356	263	213	184	166	155	149	148	151	159	172	194	229	291
1981 MAR 7.0	473	437	404	375	350	326	307	290	276	266	258	254	253	256	263	276	296	326	369	432	526
JD 2444660.5	252	328	490	1022	5464	823	444	311	245	207	184	170	162	159	161	167	180	199	232	286	387
1981 FEB 25.0	456	422	392	365	338	319	301	286	274	265	259	256	257	262	272	289	314	351	405	485	607
JD 2444650.5	311	436	769	3353	1278	562	367	279	231	202	184	174	169	169	174	185	203	232	279	365	546
1981 FEB 15.0	441	409	380	356	331	312	296	282	272	264	260	259	262	270	284	305	336	383	452	557	713
JD 2444640.5	394	623	1575	2490	734	436	317	256	220	198	184	178	176	180	189	205	230	272	344	486	870
1981 FEB 5.0	426	396	370	344	324	306	292	280	271	265	262	264	269	280	298	325	366	425	515	651	840
JD 2444630.5	525	1032	8716	1018	525	361	282	237	210	194	185	181	183	190	204	227	263	324	438	704	1911
1981 JAN 26.0	412	384	353	336	317	301	288	278	271	267	266	270	279	294	317	352	403	481	599	771	956
JD 2444620.5	768	2667	1603	647	412	310	255	222	202	190	185	185	190	202	222	253	305	397	592	1227	0
1981 JAN 16.0	399	374	348	328	311	297	285	277	272	270	272	278	291	311	341	386	453	555	708	901	0
JD 2444610.5	1391	3498	833	476	341	272	233	208	194	187	185	189	198	215	242	285	360	508	900	4023	1405
1981 JAN 6.0	387	360	340	322	306	293	284	277	274	274	279	290	307	333	372	430	519	652	837	988	999
JD 2444600.5	5659	1166	561	377	291	243	214	197	187	184	185	192	206	229	266	327	440	704	1854	2416	770
1980 DEC 27.0	378	351	332	316	302	291	283	279	278	281	290	304	327	361	412	488	604	773	954	1000	995
JD 2444590.5	1972	684	421	311	253	219	198	186	181	180	185	197	215	246	296	384	570	1160	0	993	526
1980 DEC 17.0	363	343	326	311	299	290	284	282	284	290	303	323	353	397	464	564	713	900	0	997	990
JD 2444580.5	889	477	333	263	222	198	184	176	174	177	186	201	226	266	335	470	821	3359	1413	610	395
1980 DEC 7.0	355	336	320	307	297	290	287	287	292	303	320	346	385	443	530	660	838	986	999	993	984
JD 2444570.5	558	361	273	225	197	180	170	167	168	174	186	206	238	292	391	617	1540	0	734	432	312
1980 NOV 27.0	347	330	316	305	297	292	291	295	303	318	341	375	426	502	615	776	950	0	996	988	976
JD 2444560.5	396	284	228	195	175	164	158	157	161	170	186	212	254	327	479	937	8927	941	479	327	253
1980 NOV 17.0	340	325	313	304	298	296	298	305	317	337	368	412	478	576	719	896	997	998	991	981	967

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS

M19
E14

UPPER PARAMETER = PERIHELION DIST (NEGATIVE IF NO PERIHELION TRANSIT)(.001 AU)
LOWER PARAMETER = APHELION DIST (NEGATIVE IF NO APHELION TRANSIT)(.001 AU)

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD 2444680.5	-617	-675	-730	-780	-826	-864	-903	-934	-960	-981	-997	-1007	-1013	1014	1007	994	971	938	890	822	722
1981 MAR 17.0	1803	1791	1778	1765	1752	1741	1727	1716	1707	1699	1694	1690	1690	1693	1701	1714	1735	1766	1811	1877	1975
JD 2444670.5	-646	-702	-755	-802	-845	-885	-918	-946	-970	-988	-1001	-1010	1014	1011	1001	983	955	914	855	769	642
1981 MAR 7.0	1808	1795	1782	1768	1756	1742	1731	1721	1712	1705	1701	1699	1700	1705	1716	1733	1759	1798	1854	1938	2063
JD 2444660.5	-676	-729	-779	-824	-868	-901	-932	-957	-978	-994	-1005	-1011	1012	1005	992	969	934	883	809	699	534
1981 FEB 25.0	1812	1799	1786	1773	1755	1746	1736	1726	1718	1712	1709	1708	1711	1719	1733	1755	1788	1837	1908	2016	2181
JD 2444650.5	-704	-756	-802	-843	-884	-917	-945	-968	-986	-1000	-1008	1012	1008	998	979	950	906	842	747	604	392
1981 FEB 15.0	1816	1803	1790	1778	1762	1751	1741	1732	1725	1720	1718	1719	1725	1736	1754	1782	1824	1886	1979	2121	2335
JD 2444640.5	-732	-781	-825	-867	-901	-931	-957	-977	-993	-1004	-1009	1009	1002	987	962	924	869	786	663	477	219
1981 FEB 5.0	1821	1807	1794	1778	1767	1756	1746	1738	1732	1729	1729	1732	1741	1756	1780	1816	1870	1950	2072	2259	2523
JD 2444630.5	-760	-805	-855	-885	-918	-945	-968	-986	-998	-1006	1009	1005	993	972	939	891	819	712	551	314	61
1981 JAN 26.0	1825	1811	1789	1784	1772	1762	1753	1746	1741	1739	1741	1748	1760	1781	1812	1858	1928	2033	2195	2435	2703
JD 2444620.5	-786	-828	-870	-903	-933	-957	-977	-992	-1002	1007	1006	997	979	952	909	847	754	613	403	136	0
1981 JAN 16.0	1829	1817	1800	1789	1778	1768	1760	1754	1751	1752	1756	1766	1783	1810	1851	1911	2003	2143	2355	2631	0
JD 2444610.5	-810	-855	-889	-920	-947	-969	-986	-997	-1004	1005	999	985	961	924	870	788	666	482	226	17	-1
1981 JAN 6.0	1834	1817	1806	1794	1784	1775	1768	1764	1763	1766	1774	1789	1812	1847	1900	1980	2101	2286	2548	2775	3009
JD 2444600.5	-831	-874	-907	-935	-959	-978	-992	-1000	1004	1000	989	969	937	889	817	711	550	316	65	-0	-6
1980 DEC 27.0	1842	1824	1812	1801	1791	1783	1778	1776	1777	1783	1796	1816	1847	1893	1963	2068	2229	2466	2731	3011	3036
JD 2444590.5	-859	-893	-924	-949	-970	-986	-996	1002	1001	992	975	947	904	841	748	608	401	140	0	-3	-14
1980 DEC 17.0	1842	1830	1818	1808	1799	1793	1790	1790	1794	1804	1821	1849	1889	1950	2042	2181	2391	2662	0	3039	3061
JD 2444580.5	-880	-912	-939	-962	-979	-991	-998	1000	994	979	955	918	862	780	658	476	227	19	-1	-9	-24
1980 DEC 7.0	1848	1836	1825	1816	1809	1805	1803	1806	1814	1829	1853	1889	1942	2022	2144	2327	2582	2807	3042	3066	3084
JD 2444570.5	-899	-928	-952	-972	-986	-995	998	995	983	962	929	880	808	701	542	315	70	0	-5	-18	-37
1980 NOV 27.0	1855	1844	1834	1826	1821	1818	1820	1826	1838	1859	1890	1938	2008	2114	2273	2503	2761	0	3070	3090	3106
JD 2444560.5	-917	-943	-964	-980	-991	996	995	986	968	939	895	831	737	599	397	147	5	-2	-13	-29	-52
1980 NOV 17.0	1863	1852	1844	1837	1834	1834	1838	1849	1867	1894	1936	1998	2090	2228	2432	2691	2855	3074	3096	3113	3127

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

M19
E14

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = INTEGRAL OF (DT/R**2) (DAYS/AU**2)
LOWER PARAMETER = INTEGRAL OF (DT/R) (DAYS/AU)

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD 2444680.5	136	142	148	155	161	168	176	183	190	198	206	214	222	231	240	249	259	270	282	298	319
1981 MAR 17.0	206	213	222	230	238	246	255	264	273	281	290	299	308	317	326	336	345	354	363	372	381
JD 2444670.5	140	146	152	159	166	173	180	188	195	203	211	219	228	236	246	255	265	277	291	309	338
1981 MAR 7.0	212	220	228	236	245	253	262	271	279	288	297	306	315	324	333	343	352	361	370	379	388
JD 2444660.5	144	150	157	164	171	178	185	193	200	208	216	225	233	242	251	261	272	285	301	325	368
1981 FEB 25.0	218	226	234	243	252	260	269	277	286	295	304	313	322	331	340	350	359	368	377	386	394
JD 2444650.5	148	155	161	168	175	183	190	198	205	213	222	230	239	248	258	268	280	295	315	348	424
1981 FEB 15.0	225	233	241	249	258	267	275	284	293	302	311	320	329	338	347	357	366	375	384	392	400
JD 2444640.5	152	159	166	173	180	187	195	203	211	219	227	236	245	254	264	276	289	306	333	387	556
1981 FEB 5.0	231	239	247	256	265	273	282	291	300	309	318	327	336	345	354	364	373	381	390	398	406
JD 2444630.5	156	163	171	177	185	192	200	208	216	224	233	241	251	260	271	284	299	322	363	469	1045
1981 JAN 26.0	237	245	255	263	271	280	289	298	307	316	325	334	343	352	361	370	379	388	397	404	410
JD 2444620.5	161	167	175	182	189	197	205	213	221	229	238	247	257	267	279	293	313	345	418	700	0
1981 JAN 16.0	244	252	261	269	278	287	296	305	314	323	332	341	350	359	368	377	386	395	403	409	0
JD 2444610.5	165	172	179	187	194	202	210	218	226	235	244	253	263	275	288	305	332	385	548	1974	118
1981 JAN 6.0	250	259	267	276	285	293	302	311	321	330	339	348	357	366	375	384	393	401	408	413	254
JD 2444600.5	169	176	184	191	199	207	215	223	232	240	250	260	270	283	299	321	362	467	1012	118	118
1980 DEC 27.0	256	265	274	282	291	300	309	318	327	336	346	355	364	373	382	390	399	406	412	253	256
JD 2444590.5	174	181	188	196	204	212	220	228	237	246	256	266	278	293	313	345	418	691	0	118	119
1980 DEC 17.0	263	271	280	289	298	307	316	325	334	343	352	361	370	379	388	397	405	411	0	256	259
JD 2444580.5	178	185	193	200	208	217	225	234	243	252	262	274	287	305	332	386	546	1848	118	118	119
1980 DEC 7.0	269	278	286	295	304	313	322	332	341	350	359	368	377	386	395	403	410	415	255	258	261
JD 2444570.5	182	189	197	205	213	221	230	239	248	258	270	282	298	322	363	467	969	0	118	119	120
1980 NOV 27.0	275	284	293	302	311	320	329	338	347	356	365	375	383	392	401	408	414	0	258	260	264
JD 2444560.5	186	194	202	210	218	226	235	245	254	265	277	292	313	346	418	673	3797	117	118	119	121
1980 NOV 17.0	281	290	299	308	317	326	335	345	354	363	372	381	390	398	406	413	417	257	260	263	266

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M19 E14

UPPER PARAMETER = PERIGEE SPEED AT EARTH DEPARTURE/ARVL (.01 KM/SEC)

ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

	(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD 2444680.5 1981 MAR 17.0		1524	1524	1524	1524	1524	1524	1443	1323	1267	1228	1200	1181	1172	1173	1184	1209	1249	1312	1406	1524	1524
JD 2444670.5 1981 MAR 7.0		1524	1524	1524	1524	1524	1524	1368	1296	1249	1215	1192	1177	1173	1178	1196	1228	1280	1359	1479	1524	1524
JD 2444660.5 1981 FEB 25.0		1524	1524	1524	1524	1524	1432	1329	1273	1233	1204	1185	1175	1176	1187	1212	1255	1321	1423	1524	1524	1524
JD 2444650.5 1981 FEB 15.0		1524	1524	1524	1524	1524	1367	1299	1252	1218	1194	1180	1175	1182	1201	1235	1291	1377	1510	1524	1524	1524
JD 2444640.5 1981 FEB 5.0		1524	1524	1524	1524	1418	1328	1274	1234	1205	1186	1177	1179	1192	1220	1267	1340	1453	1524	1524	1524	1524
JD 2444630.5 1981 JAN 26.0		1524	1524	1524	1495	1361	1297	1251	1218	1194	1181	1178	1186	1208	1247	1310	1407	1524	1524	1524	1524	1524
JD 2444620.5 1981 JAN 16.0		1524	1524	1524	1401	1322	1270	1232	1204	1186	1179	1183	1199	1232	1285	1369	1498	1524	1524	1524	1524	0
JD 2444610.5 1981 JAN 6.0		1524	1524	1454	1350	1290	1247	1215	1193	1182	1181	1193	1219	1265	1337	1449	1524	1524	1524	1524	1524	1524
JD 2444600.5 1980 DEC 27.0		1524	1524	1382	1312	1263	1227	1201	1186	1181	1188	1210	1248	1311	1409	1524	1524	1524	1524	1524	1524	1524
JD 2444590.5 1980 DEC 17.0		1524	1422	1336	1280	1240	1210	1191	1182	1185	1202	1235	1289	1375	1506	1524	1524	1524	1524	0	1524	1524
JD 2444580.5 1980 DEC 7.0		1479	1362	1300	1254	1220	1197	1185	1184	1196	1223	1271	1346	1461	1524	1524	1524	1524	1524	1524	1524	1524
JD 2444570.5 1980 NOV 27.0		1394	1320	1269	1231	1205	1188	1184	1192	1214	1255	1321	1422	1524	1524	1524	1524	1524	0	1524	1524	1524
JD 2444560.5 1980 NOV 17.0		1344	1287	1244	1213	1193	1185	1189	1206	1242	1299	1389	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524

	(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

M19
E14

EARTH - MARS TRAJECTORY PARAMETERS

MARS ARRIVAL OR DEPARTURE DATE

UPPER PARAMETER = PROPULSIVE DELTA V REQ. FOR EARTH DEP./CAPTURE (.01 KM/SEC)
LOWER PARAMETER = PROPULSIVE DELTA V REQ. FOR MARS CAPTURE/DEP. (.01 KM/SEC)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

	(FLT T)(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD 2444680.5	372	257	154	66	14	1140	0	0	0	0	0	0	0	0	0	0	0	0	25	247	
1981 MAR 17.0	916	833	761	703	682	1719	590	498	460	434	416	405	400	403	414	435	469	521	600	719	905
JD 2444670.5	315	207	113	44	173	147	0	0	0	0	0	0	0	0	0	0	0	0	0	141	439
1981 MAR 7.0	907	829	764	722	876	811	558	506	474	451	435	427	425	432	448	476	520	587	688	845	1095
JD 2444660.5	261	161	80	74	1666	0	0	0	0	0	0	0	0	0	0	0	0	0	55	303	714
1981 FEB 25.0	899	827	773	792	2107	636	557	517	489	469	456	451	453	465	487	524	581	668	801	1010	1353
JD 2444650.5	209	120	70	792	31	0	0	0	0	0	0	0	0	0	0	0	0	0	194	534	1111
1981 FEB 15.0	891	828	802	1451	766	615	564	530	506	489	479	478	485	502	533	581	656	770	947	1233	1713
JD 2444640.5	162	91	200	433	0	0	0	0	0	0	0	0	0	0	0	0	0	105	390	868	1679
1981 FEB 5.0	886	839	952	1130	683	614	574	544	524	510	505	508	521	546	587	651	748	900	1141	1540	2210
JD 2444630.5	122	110	3019	0	0	0	0	0	0	0	0	0	0	0	0	0	33	273	671	1350	2423
1981 JAN 26.0	886	888	3243	774	668	619	585	560	543	534	533	542	562	596	651	736	865	1069	1403	1966	2845
JD 2444620.5	102	550	140	0	0	0	0	0	0	0	0	0	0	0	0	0	178	512	1077	2014	0
1981 JAN 16.0	900	1277	939	727	666	627	598	578	565	560	565	580	609	656	729	841	1015	1296	1765	2534	0
JD 2444610.5	179	849	0	0	0	0	0	0	0	0	0	0	0	0	0	101	382	854	1650	2808	2969
1981 JAN 6.0	987	1531	797	716	670	637	613	597	589	590	601	625	665	728	825	974	1212	1604	2256	3195	3382
JD 2444600.5	1794	22	0	0	0	0	0	0	0	0	0	0	0	0	36	276	671	1339	2387	3023	2872
1980 DEC 27.0	2274	895	767	713	676	649	629	618	616	623	642	676	731	815	944	1146	1474	2021	2869	3430	3313
JD 2444590.5	270	0	0	0	0	0	0	0	0	0	0	0	0	0	188	522	1079	1990	0	2927	2774
1980 DEC 17.0	1113	823	757	715	684	662	648	642	646	661	689	736	809	921	1094	1371	1827	2562	0	3360	3242
JD 2444580.5	0	0	0	0	0	0	0	0	0	0	0	0	0	115	399	865	1638	2751	2983	2831	2676
1980 DEC 7.0	891	801	754	719	694	677	668	669	679	703	744	807	904	1053	1287	1668	2289	3174	3401	3286	3169
JD 2444570.5	0	0	0	0	0	0	0	0	0	0	0	0	53	296	688	1336	2335	0	2889	2734	2579
1980 NOV 27.0	847	791	753	725	705	694	691	698	718	752	808	892	1021	1220	1538	2057	2848	0	3326	3211	3094
JD 2444560.5	0	0	0	0	0	0	0	0	0	0	0	1	210	542	1084	1947	3066	2950	2795	2639	2482
1980 NOV 17.0	828	786	755	733	718	713	717	732	761	809	883	994	1165	1432	1864	2544	3413	3361	3248	3134	3018
	(FLT T)(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE

MARS ARRIVAL OR DEPARTURE DATE

EARTH - MARS TRAJECTORY PARAMETERS M19 E14

UPPER PARAMETER = TOTAL PROPULSIVE DELTA V REQ. FOR ONE-WAY TRIP (.01 KM/SEC)
LOWER PARAMETER = HELIOCENTRIC TRANSFER ANGLE (.1 DEG)
ALPARK = 325., ECPARK = 0. , ALMARS = 800., ECMARS = 0. , ALENT = 122., ENTMAX = 15.24

(FLT T)	(320)	(330)	(340)	(350)	(360)	(370)	(380)	(390)	(400)	(410)	(420)	(430)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)
JD 2444680.5	1288	1090	915	769	696	2859	590	498	460	434	416	405	400	403	414	435	469	521	600	744	1153
1981 MAR 17.0	1283	1384	1485	1585	1685	1780	1885	1983	2081	2178	2275	2371	2467	2563	2658	2754	2849	2944	3040	3136	3232
JD 2444670.5	1222	1037	877	766	1049	959	558	506	474	451	435	427	425	432	448	476	520	587	688	986	1534
1981 MAR 7.0	1345	1446	1547	1648	1746	1850	1948	2046	2143	2241	2337	2434	2530	2625	2721	2816	2912	3007	3102	3198	3294
JD 2444660.5	1159	988	853	865	3772	636	557	517	489	469	456	451	453	465	487	524	581	668	856	1314	2067
1981 FEB 25.0	1408	1509	1610	1710	1820	1912	2010	2109	2206	2304	2400	2497	2593	2688	2784	2879	2975	3070	3165	3261	3357
JD 2444650.5	1100	948	873	2243	796	615	564	530	506	489	479	478	485	502	533	581	656	770	1141	1768	2824
1981 FEB 15.0	1471	1572	1673	1769	1876	1975	2074	2172	2270	2367	2464	2560	2656	2752	2847	2943	3038	3133	3229	3324	3420
JD 2444640.5	1048	930	1151	1563	683	614	574	544	524	510	505	508	521	546	587	651	748	1005	1531	2409	3889
1981 FEB 5.0	1534	1635	1735	1842	1939	2038	2137	2235	2333	2430	2527	2623	2719	2815	2911	3006	3101	3196	3292	3387	3483
JD 2444630.5	1008	997	6262	774	668	619	585	560	543	534	533	542	562	596	651	736	898	1343	2075	3316	5268
1981 JAN 26.0	1598	1698	1818	1903	2002	2102	2200	2299	2397	2494	2591	2687	2783	2879	2974	3069	3165	3260	3355	3450	3545
JD 2444620.5	1002	1827	1078	727	666	627	598	578	565	560	565	580	609	656	729	841	1194	1808	2843	4548	0
1981 JAN 16.0	1661	1759	1867	1966	2066	2165	2264	2362	2460	2557	2654	2750	2846	2942	3037	3133	3228	3323	3418	3513	0
JD 2444610.5	1166	2380	797	716	670	637	613	597	589	590	601	625	665	728	825	1075	1594	2457	3906	6003	6351
1981 JAN 6.0	1723	1832	1929	2029	2129	2228	2327	2425	2523	2620	2717	2813	2909	3005	3101	3196	3291	3386	3481	3571	76
JD 2444600.5	4068	917	767	713	676	649	629	618	616	623	642	676	731	815	980	1422	2146	3360	5256	6453	6185
1980 DEC 27.0	1778	1891	1991	2091	2191	2291	2390	2488	2586	2683	2780	2876	2972	3068	3163	3259	3354	3449	3542	45	138
JD 2444590.5	1382	823	757	715	684	662	648	642	646	661	689	736	809	921	1283	1893	2906	4552	0	6286	6017
1980 DEC 17.0	1853	1953	2053	2154	2254	2353	2452	2550	2648	2745	2842	2939	3034	3130	3226	3321	3416	3510	0	105	200
JD 2444580.5	891	801	754	719	694	677	668	669	679	703	744	807	904	1169	1686	2533	3927	5925	6385	6117	5846
1980 DEC 7.0	1913	2014	2115	2215	2315	2415	2514	2612	2710	2807	2904	3000	3096	3192	3287	3382	3477	3569	71	166	262
JD 2444570.5	847	791	753	725	705	694	691	698	718	752	808	892	1074	1516	2227	3394	5183	0	6215	5945	5673
1980 NOV 27.0	1974	2075	2176	2276	2376	2476	2575	2673	2771	2869	2965	3061	3157	3253	3348	3443	3537	0	131	227	323
JD 2444560.5	828	786	755	733	718	713	717	732	761	809	883	995	1375	1974	2948	4491	6479	6311	6043	5772	5500
1980 NOV 17.0	2034	2135	2236	2337	2437	2536	2635	2733	2831	2928	3025	3122	3218	3313	3408	3503	3584	96	191	287	383

(FLT T)	(440)	(450)	(460)	(470)	(480)	(490)	(500)	(510)	(520)	(530)	(540)	(550)	(560)	(570)	(580)	(590)	(600)	(610)	(620)	(630)	(640)

JD2445000.5 1982 JAN 31.0 | JD2445040.5 1982 MAR 12.0 | JD2445080.5 1982 APR 21.0 | JD2445120.5 1982 MAY 31.0 | JD2445160.5 1982 JUL 10.0

EARTH DEPARTURE OR ARRIVAL DATE